VOLUME 26
NUMBER 8

Journal OF THE American Dietetic Association

Publishing Office
Mt. Royal and Guilford Aves.
Baltimore 2, Md.

American Dietetic Association
620 N. Michigan Ave., Chicago 11, Ill.

CONTENTS, AUGUST 1950

UTILIZATION OF CAROTENE AND VITAMIN A BY HYPERTHYROID AND PREGNANT RATS—*Agnes Fay Morgan and Clara E. White* 569

CALCULATION OF DIABETIC DIETS—Report of the Committee on Diabetic Diet Calculations, American Dietetic Association. Prepared cooperatively with the Committee on Education, American Diabetes Association, and the Diabetes Branch, U.S. Public Health Service 575

EFFECT OF ADDING SOY FLOUR TO THE PROTEIN VALUE OF BAKED PRODUCTS—*May S. Reynolds and Christine Hall* 584

EFFECT OF COCOA ON PROTEIN UTILIZATION—*May S. Reynolds and Ruth Ann Beyer* 590

OBSERVATIONS ON PROTEIN IMPROVEMENTS IN LOW-EXTRACTION WHEAT FLOUR—Supplementation with Soya or Cereal Germ in an Italian Nutrition Program—*Ruth Flumerfelt, Pasquale deCaprio, and Elmer L. Sevringhaus* 592

TRENDS IN FAMILY FOOD CONSUMPTION—*Hazel K. Stiebeling, Ph.D.* 596

EDITORIAL

The Chart of Speakers Comes to Life—Advance Convention Program Notes 599

CURRENT COMMENT

Is Dynamic Knowledge of Nutrition Essential for *Every* Dietitian?—*Gertrude E. Miller* ... 600

BOOK REVIEWS 608

CURRENT LITERATURE 610

NEWS NOTES 616

The Journal of the American Dietetic Association is published monthly by the American Dietetic Association, Mt. Royal & Guilford Aves., Baltimore 2, Md., and 620 N. Michigan Ave., Chicago 11, Ill. Neither the Association nor the Editor assumes responsibility for the opinions expressed by authors of papers abstracted, quoted, or published in full in this Journal.

Subscriptions: Rate $5 per year. Special rate to undergraduate students and dietetic interns, $1.50 per year, if order is approved by head of the department. Single copies, 75 cents. All correspondence concerning Journal subscriptions, orders for copies, or reprints from the Journal, and notices of change of address should be sent to the American Dietetic Association, Mt. Royal & Guilford Aves., Baltimore 2, Md., or 620 N. Michigan Ave., Chicago 11, Ill. Notices regarding change of address should reach the publisher by the 23rd of the month before the date of issue on which the change is to take effect and both old and new addresses should be given.

Editorial Correspondence: All articles and notices for publication, genera correspondence, and inquiries should be sent to the Editor at the American Dietetic Association, 620 N. Michigan Ave., Chicago 11, Ill. Manuscripts are accepted for publication on condition that they are contributed solely to the Journal. Copy must be double-spaced and two copies, an original and one carbon, submitted.

Advertising: All correspondence concerning advertising should be addressed to the American Dietetic Association, 620 N. Michigan Ave., Chicago 11, Ill.

COPYRIGHT, 1950, BY THE AMERICAN DIETETIC ASSOCIATION Printed in U.S.A.
Entered as second-class matter June 30, 1925 at the Post Office at Baltimore, Md., under the act of August 24, 1912
Published monthly by The American Dietetic Association

OFFICERS, 1949–1950 AMERICAN DIETETIC ASSOCIATION

Headquarters of the Association: 620 N. Michigan Ave., Chicago 11

Coordinating Cabinet

EXECUTIVE BOARD

President, ELIZABETH PERRY, City Hospital, Cleveland, Ohio
President-Elect, LILLIAN STORMS COOVER, 2121 Hughes Avenue, Ames, Iowa
Vice-President, FERN W. GLEISER, School of Business, University of Chicago
Secretary and Chairman, Membership Committee, MARGARET A. OHLSON, Michigan State College, East Lansing
Treasurer and Chairman, Finance Committee, WINIFRED H. ERICKSON, Ancker Hospital, St. Paul, Minnesota

SECTION CHAIRMEN

Community Nutrition, Mary Reeves, U. S. Social Security Board, 69 W. Washington Street, Chicago
Diet Therapy, MARGUERITE L. PETTEE, The Colorado Medical Center, Denver
Food Administration, MARION D. FLOYD, Hospital Division, U.S. Public Health Service, Washington, D. C.
Professional Education, ERCEL S. EPPRIGHT, Iowa State College, Ames

COUNCIL OF THE HOUSE OF DELEGATES

Speaker of the House of Delegates, FERN W. GLEISER, School of Business, University of Chicago
LUCILLE M. REFSHAUGE, Secretary of Council, Hartford Hospital, Hartford, Connecticut ..... 2 years
HELEN L. GILLUM, University of California, Berkeley, California ..... 2 years
ALTA B. ATKINSON, Teachers College, Columbia University, New York City ..... 1 year
ALICE H. SMITH, Michigan State Department of Health, Lansing ..... 1 year

Staff

Headquarters Office

Ruth M. Yakel, Executive Secretary
MILDRED L. EGEBERG, Business Manager
MABLE MACLACHLAN, Educational Director
To be appointed, Placement Bureau Director
THELMA POLLEN, Public Relations Director
MARGARET L. ROSS, Professional Activities Director
DOROTHEA F. TURNER, Editor, Journal
HARRIET E. SANKEY, Managing Editor, Journal
MARGENE WAGSTAFF, Publications Assistant
MARY ELLEN JOHNSON, Assistant to Educational Director

ADVISORY BOARD

WENDELL F. GRIFFITH, Ph.D., University of Texas, Dept. of Biochemistry, Galveston 1950
JAMES W. SHERRILL, M.D., The Scripps Metabolic Clinic, La Jolla, California 1951
FRED G. CARTER, M.D., St. Luke's Hospital, Cleveland Ohio 1952

JOURNAL BOARD

E. NEIGE TODHUNTER, University of Alabama, University 1950
MARTHA NELSON LEWIS, Ohio State University Hospital, Columbus 1950
CLARICE GULLICKSON, Veterans Administration, Washington, D. C. 1950
CORINNE ROBINSON, 90 East Stewart Avenue, Lansdowne, Pennsylvania 1951
ICIE MACY HOOBLER, Children's Fund of Michigan, Detroit. 1951
MARGUERITE J. QUENEAU, Department of Health, State of New York, Albany 1951
MIRIAM LOWENBERG, Rochester Child Health Institute, Rochester, Minnesota 1952
LEVELLE WOOD, Ohio State University, Columbus 1952
DORIS JOHNSON, Department of Home Economics, University of Wisconsin, Madison 1952

PLACEMENT BUREAU BOARD

E. EVELYN SMITH, University of Illinois, Urbana 1950
BERTLYN BOSLEY, North Carolina State Board of Health, Raleigh 1950
ELIZABETH COLE, Mountainside Hospital, Montclair, New Jersey 1950
EDNA GILBERT, Board of Education, Youngstown, Ohio 1951
ELIZABETH HAYWARD, Las Encinas Sanitarium, Pasadena, California 1951
ELLA M ECK. University of Chicago Clinics, Chicago 1951
FRANCES A. SWENSON, Elizabeth Steel Magee Hospital, Pittsburgh, Pennsylvania 1952
BEATRICE HUGHES HOFSOMMER, Harding Restaurant, 21 South Wabash, Chicago 1952
LUCILLE BACKEMEYER, Residence Halls for Women, University of Nebraska, Lincoln 1952

INVESTIGATION BOARD

FLORANCE B. KING, University of Vermont, Burlington 1950
ETHEL A. MARTIN. National Dairy Council, Chicago 1951
FLORENCE IMLAY, 132 State Street, Lexington, Kentucky 1952

BOARD AND COMMITTEE CHAIRMEN

Awards, Scholarship and Loan Fund, P. MABEL NELSON, Iowa State College, Ames
Constitution, HELEN S. MITCHELL, University of Massachusetts, Amherst
Convention, ANNE STEWART MILLER AND JEAN CROOKS, Washington, D. C.
Educational Exhibits, GERTRUDE AUSTIN, American Institute of Baking, 1135 West Fullerton, Chicago
Finance, The Treasurer, LUTE TROUTT AND HELEN VOLK.
History of A.D.A., ANNA BOLLER BEACH, National Live Stock and Meat Board, Chicago
History of Nutrition and Dietetics, E. NEIGE TODHUNTER, University of Alabama, University
Legislation Information, MARGERY VAUGHN, 1321 S. Arlington Ridge Road, Arlington, Virginia
Nominating, LUCILLE M. REFSHAUGE, Hartford Hospital, Hartford, Connecticut
Publications, VIVIAN M. ROBERTS, Ohio University, Athens
Public Relations, REGINA G. FRISBIE, Kellogg Company, Battle Creek, Michigan
Vocational Guidance, JEANETTE V. HAMLIN, Rochester Child Health Institute, Rochester, Minnesota

STATE DIETETIC ASSOCIATIONS AFFILIATED WITH THE AMERICAN DIETETIC ASSOCIATION

ALABAMA: *President*, Mrs. Lorene Grant Smith, 1128 So. 22nd St., Birmingham, Alabama
ARIZONA: *President*, Dr. Jessie Rannels, Arizona State College, Tempe, Arizona
ARKANSAS: *President*, Mabel Herendeen, Veterans Hospital, North Little Rock, Arkansas
CALIFORNIA: *President*, Dr. Helen L. Gillum, University of California, Berkeley, California
COLORADO: *President*, Mabelle V. Williams, 710 Jasmine, Denver, Colorado
CONNECTICUT: *President*, Lucille M. Refshauge, Hartford Hospital, Hartford, Connecticut
DELAWARE: *President*, Jane E. Neal, Wilmington General Hospital, Wilmington, Delaware
DISTRICT OF COLUMBIA: *President*, Mrs. Anne Stewart Miller, 3330 N. Albemarle, Arlington, Virginia
FLORIDA: *President*, Mrs. Dorothy T. Garrett, Veterans Administration, Bay Pines, Florida
GEORGIA: *President*, Gertrude McDonald, Lawson Veterans Hospital, Chamblee, Georgia
IDAHO: *President*, Mrs. Marion R. Johnson, Box 995, McCall, Idaho
ILLINOIS: *President*, Mrs. Mary McKittrick Byrnes, Mercy Hospital, 2537 S. Prairie, Chicago, Illinois
INDIANA: *President*, Mrs. Kathryn Sheedy, City Hospital, Indianapolis 7, Indiana
IOWA: *President*, May Morris, 4324 Franklin Avenue, Des Moines, Iowa
KANSAS: *President*, Mary L. Smull, Kansas State College, Manhattan, Kansas
KENTUCKY: *President*, Mrs. Helen Koons Smits, Massie Memorial Hospital, Paris, Kentucky
LOUISIANA: *President*, Mrs. Frances A. Halbert, 2004 Tulane Avenue, New Orleans, Louisiana
MAINE: *President*, Mary E. Morse, Eastern Maine General Hospital, Bangor, Maine
MARYLAND: *President*, Sybil J. Bangs, West Baltimore General Hospital, Baltimore, Maryland
MASSACHUSETTS: *President*, Alice M. Fenno, Harvard University, School of Business Administration, Boston, Massachusetts
MICHIGAN: *President*, Onalee Hostetler, Grace Hospital, Detroit 1, Michigan
MINNESOTA: *President*, Alice Biester, School of Home Economics, University of Minnesota, St. Paul 1, Minn.
MISSISSIPPI: *President*, Margaret Pettyjohn, University, Mississippi
MISSOURI: *President*, Mrs. Marie Harrington, 4030 Chouteau Street, St. Louis, Missouri
MONTANA: *President*, Marion Kelly, Murray Hospital, Butte, Montana
NEBRASKA: *President*, Lucille Backemeyer, University of Nebraska, Lincoln, Nebraska
NEW HAMPSHIRE: *President*, Clara F. Watkins, Franklin Hospital, Franklin, New Hampshire
NEW JERSEY: *President*, Elizabeth McHugh, American Red Cross, 232 S. Harrison St., East Orange, New Jersey
NEW MEXICO: *President*, Dorothy Hacker, P. O Box 305, Santa Fe, New Mexico
NEW YORK: *President*, Meredith Jones, 1320 York Avenue, New York, N. Y.
NORTH CAROLINA: *President*, Delilah H. Siler, Rex Hospital, Raleigh, North Carolina
NORTH DAKOTA: *President*, Mrs. Dorothy Revell, 1450 Eighth Street, South, Fargo, North Dakota
OHIO: *President*, Gladys L. Mason, Huron Road Hospital, East Cleveland, Ohio
OKLAHOMA: *President*, Mrs. Mary Gray Butler, 1931 N.W. 16th Street, Oklahoma City, Oklahoma
OREGON: *President*, Betty Jane Bolton, Salem General Hospital, Salem, Oregon
PENNSYLVANIA: *President*, Evelyn A. Carpenter, Philadelphia Hospital for Contagious Diseases, Philadelphia, Pennsylvania
RHODE ISLAND: *President*, Ruth B. Mather, Rhode Island Hospital, Providence Rhode Island
SOUTH CAROLINA: *President*, Mrs. Emily V. Lee, Apt. C-12C Carovets, Columbia, South Carolina
SOUTH DAKOTA: *President*, Sister M. Inez, Sacred Heart Hospital, Yankton, South Dakota
TENNESSEE: *President*, Anna L. Carpenter, Court House, Chattanooga, Tennessee
TEXAS: *President*, Florence Langford, Box 2376, T.S.C.W. Station, Denton, Texas
UTAH: *President*, Jo Beth Johnson, 132 University, Salt Lake City, Utah
VERMONT: *President*, F. Aline Gravel, Mary Fletcher Hospital, Burlington, Vermont
VIRGINIA: *President*, Margaret Fitzhugh, 407 N. 12th St., Richmond, Virginia
WASHINGTON: *President*, Mildred Bonnell, 204 Raitt Hall, University of Washington, Seattle, Washington
WEST VIRGINIA: *President*, Ona F. Stinson, McMillan Hospital, Charleston, West Virginia
WISCONSIN: *President*, Iva Welch, Brokaw Hall, Lawrence College, Appleton, Wisconsin]
HAWAII: *President*, Mary Lum, Kapiolani Hospital, Honolulu, Hawaii

Utilization of Carotene and Vitamin A by Hyperthyroid and Pregnant Rats[1]

AGNES FAY MORGAN and CLARA E. WHITE

Department of Home Economics, University of California, Berkeley

POO, Lew and Addis (1) reported in 1939 that the alimentary tract, heart, kidney, and liver of pregnant rats were enlarged over those of non-pregnant controls and that the greatest increase occurred in the liver. Moreover, the proportion of total maternal protein assigned to the liver was increased by 28 per cent, whereas the proportion assigned to other organs, except for the alimentary tract, was decreased. Poo and co-workers (2) later found that increasing the level of dietary protein up to 27 per cent increased the hypertrophy of these organs, but when compared with that of non-pregnant rats, the decreased concentration of total body protein was still evident in all organs and tissues except the liver. They attempted to produce this condition in non-pregnant rats by injection of estradiol but were unsuccessful. We also repeated this experiment but found no liver hypertrophy resulting from the use of progesterone or estrone.

Addis, Karnofsky, Lew, and Poo (3) gave rats of both sexes 0.75 mg. thyroxine per 100 sq. cm. body surface every 48 hr. and found both size and proportion of body protein in heart, kidney, and liver significantly increased. Thyroidectomy produced the opposite result. Dinitrophenol, 2 or 3 mg. per gram body weight every day for seven days, produced no consistent change in the organs, although the basal metabolic rate was raised as much as by the thyroxine. This is similar to the finding by Johnson and Baumann (4) that dinitrophenol had no effect on the conversion of carotene to vitamin A although thyroxine produced an increase, thus eliminating the rise in basal metabolic rate as sufficient explanation for the increased efficiency of carotene conversion.

In a more recent study, the livers of pregnant mice were found to be increased in size only in proportion to increase in body weight (5), but the ascorbic acid content of the livers was significantly increased above that of non-pregnant controls. Similarly, in pregnant rats, increases in liver weight and liver ascorbic acid were found, but the liver weight was increased beyond that of the total body weight (6). The significance of this increase in liver ascorbic acid is not evident, but its importance in considering the ascorbic acid needs of pregnant women is obvious. The low plasma ascorbic acid levels of pregnant women (7) may be in part explained by this excessive saturation need of the liver and perhaps other organs. The high ascorbic acid plasma levels of the fetus may account for the difficulty of maintaining normal levels in the maternal plasma, a difficulty exaggerated by the increased saturation need of the mother.

PREGNANCY AND VITAMIN A

Clinical trials have shown that in human pregnancy there is a significant fall in the maternal plasma vitamin A during the last trimester with an unfailing rise post-partum (8–11). The fetal plasma vitamin A is low and independent of the maternal level, but fetal plasma carotene may be affected by maternal dietary intake. Lewis and co-workers (12), however, found no effect on fetal blood levels even when large doses of vitamin A were given to the mother.

The exact requirements of vitamin A for gestation have not been set for rats. It has been assumed that some increase in utilization accompanies the increase in weight of tissue due to pregnancy, but comparisons of the values of carotene and vitamin A during this function have not been recorded. New born rats have very low stores of vitamin A (13) and these stores are not affected by maternal intake.

VITAMIN A UTILIZATION IN HYPERTHYROIDISM

Depletion of vitamin A in animals by thyroid hormone administration has been reported by Abelin (14), Sure and Buchanan (15), and others. Others have reported no reduction in vitamin A reserves in hyperthyroidism (16, 17). Using rats of the same strain as those employed in the experiments reported here, Brown and Morgan (18) found no cumulative effect of thyroid treatment imposed upon vitamin A deficiency. The vitamin A requirement was not increased by thyroid treatment in either sex, and the female vitamin-deficient rats were benefited by the mild hyperthyroidism.

[1] Presented at the 32nd Annual Meeting of the American Dietetic Association in Denver, on October 13, 1949.

The transformation of carotene to vitamin A has been assumed to be decreased in depression of thyroid activity since carotinemia has been reported in hypothyroid patients, (19, 20) and xerophthalmia in thyroidectomized rabbits (21) and rats (22) given small doses of carotene. Administration of thiouracil or thiourea has been reported to decrease the ability of carotene-fed rats to store liver vitamin A and thyroxine to increase it, although neither of these treatments affected the use of preformed vitamin A (4). According to Wiese *et al.* (23), on the other hand, thiouracil did not affect the liver vitamin A of thiouracil-treated rats given one dose of 0.348 mg. carotene after depletion. Obviously the age and size of the animals, the level and total magnitude of the carotene or vitamin A doses administered, and the severity of the induced thyroid derangement varied in all of these experiments. Moreover, the liver stores were compared in some cases on the basis of total vitamin per liver, in others as vitamin per gram of liver, and in others results were judged solely by ocular conditions or by weight changes. The amount of carotene or of vitamin A given in most of the studies has been small and the resulting body reserves of the vitamin marginal in amount.

EXPERIMENTAL PROCEDURE

Clear cut evidence as to the utilization of vitamin A and carotene during pregnancy and hyperthyroidism thus appears to be lacking. The National Research Council recommendation (24) of 6000 I.U. vitamin A daily for the pregnant woman, an increase over the 5000 I.U. allowance for non-pregnant adult women, obviously is based on the assumption of increased need due to pregnancy. It is assumed also that two-thirds of the vitamin A will be obtained from carotene and that carotene has half or less than half the value of preformed vitamin A. If carotene is more or less well utilized in pregnancy than in the non-pregnant condition, some modification of the recommendation might be desirable. The recommendation of increased vitamin A in pregnancy rests on no certain experimental evidence.

This experiment was set up to simplify the conditions for the study of this problem by using only young adult female rats, 100 to 110 days of age and close to 200 gm. in weight. All were depleted of vitamin A in the usual way and then maintained on minimal but growth-allowing daily doses of carotene (20 mcg.) or vitamin A (3 mcg.) until the desired age and weight were reached. Rats were sacrificed and their livers examined for vitamin A at regular intervals. None had such stores when the supplementation began. For twenty-one days, one-half of the rats were given 0.5 mg. carotene (carotene in oil, 19 mg. per gram) daily and the others 0.04 mg. daily vitamin A in standard fish liver oil. Both products were assayed frequently by photometric means. Some of each group were then mated; others given 0.15 gm. dried thyroid tissue, or 40, 60, or 80 mcg. thyroxine, while others were maintained without change. For twenty-one days during the pregnancy period these treatments were continued. All the rats were then killed and their liver vitamin A determined by the antimony trichloride colorimetric method as described by Gallup and Hoefers (25), the values being read in the photoelectric colorimeter, using pure vitamin A acetate as standard. The livers of the young were examined also and their vitamin A added to that of the mothers in the final evaluation.

Parts of the minced liver were used for nitrogen, fat, and moisture determinations by the usual procedures.

The basal diet used throughout for growth and maintenance contained, in per cent: vitamin-A-free casein, 22.0; fat,[2] 5.0; salt mixture (26), 2.5; brewers' yeast, 10.0; and cornstarch, 60.5. For the pregnant animals the diet used contained vitamin-A-free casein, 35.0; fat,[2] 10.0; salt mixture (26), 5.0; brewers' yeast, 10.0; and cornstarch, 40.0. These levels of protein were chosen because Addis *et al.* (27) had found the maximum effect on liver hypertrophy or liver protein content in non-pregnant rats with diets containing 16 per cent protein, and Poo *et al.* (2) had found the maximum increase in the liver weight and liver protein of pregnant rats produced by diets containing 27 to 30 per cent protein.

RESULTS

The Liver Hypertrophy

The composition of the livers is shown in Table 1. There was no change in the fat or water content due to any of the treatments nor in the protein content of

[2] Hydrogenated cottonseed oil (Primex).

TABLE 1

Composition of livers, fresh weight, of pregnant, non-pregnant, and hyperthyroid rats

TREATMENT	SUPPLEMENT	NUMBER OF LIVERS	PROTEIN	FAT	WATER
			%	%	%
Pregnant	Carotene	7	21.2	2.6	70.2
	Vitamin A	6	21.6	3.0	70.0
Given 80 mcg. thyroxine daily	Carotene	8	24.0	2.7	70.7
	Vitamin A	8	22.5	3.3	70.6
Given 60 mcg. thyroxine daily	Carotene	8	24.3	2.8	70.2
	Vitamin A	8	23.0	3.0	70.3
Given 40 mcg. thyroxine daily	Carotene	8	23.0	3.5	70.0
Non-pregnant	Carotene	7	21.9	3.3	70.1
	Vitamin A	8	22.7	3.0	70.0

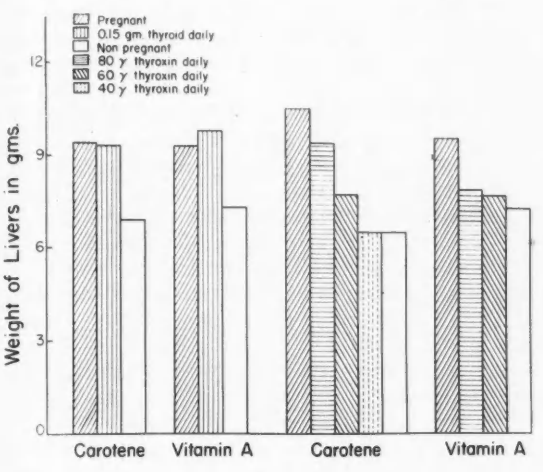


FIG. 1. *The weights of the livers of pregnant, hyperthyroid, and non-pregnant rats given supplements of carotene or vitamin A.*

the livers of pregnant as compared with non-pregnant rats. Some of the thyroid-treated rats, however, exhibited a slight increase in liver protein. In the three experiments with six separate comparisons, pregnancy alone was found to increase the weight of the liver per 100 gm. body weight without changing its composition—on the average 31 per cent above that of similar non-pregnant rats (Table 2 and Fig. 1). Under similar conditions, 0.15 gm. dried thyroid daily for twenty-one days produced 36 per cent increase, 80 mcg. thyroxine daily for twenty-one days produced 35 per cent increase, and 60 mcg. produced 21 per cent increase. Forty mcg. thyroxine daily had no effect. The average body weights of the groups of hyperthyroid rats varied from 200 to 216 gm. and of the pregnant rats from 219 to 247 gm. Whether due to increased thyroid activity or not, the pregnant state produced liver hypertrophy similar to that of 0.15 gm. thyroid or 80 mcg. thyroxine daily. These increases were evident not only in absolute liver weights but even more strikingly in proportion to total body weight.

TABLE 2

Liver weights and liver vitamin A of pregnant, hyperthyroid, and normal rats fed carotene or vitamin A

GROUP	SUPPLEMENT	NUMBER OF RATS	BODY WEIGHT	LIVER WEIGHTS		LIVER VITAMIN A			
				Total	Per 100 gm. body weight	Per gram	Per 100 gm. body weight	Per liver	Per liver plus vitamin A of litter
Experiment 1									
			gm.	*gm.*	*gm.*	*mcg.*	*mcg.*	*mcg.*	*mcg.*
Pregnant	Carotene	5	219	10.6	4.8				
Received .15 gm. dried thyroid daily	Carotene	6	202	9.1	4.5				
Non-pregnant	Carotene	7	202	7.1	3.5				
Pregnant	Vitamin A	6	233	10.2	4.4				
Non-pregnant	Vitamin A	7	221	7.8	3.5				
Experiment 2									
Pregnant	Carotene	8	226	9.4	4.2	30 ± 1.8	122	276 ± 9	297 ± 9
Received .15 gm. dried thyroid daily	Carotene	9	200	9.3	4.6	33 ± 1.7	154	307 18	
Non-pregnant	Carotene	10	208	6.9	3.3	34 ± 2.8	113	236 15	
Pregnant	Vitamin A	8	226	9.3	4.1	28 ± 3.5	116	263 11	277 ± 14
Received .15 gm. dried thyroid daily	Vitamin A	8	207	9.8	4.7	29 ± 1.3	136	284 20	
Non-pregnant	Vitamin A	11	213	7.3	3.4	36 ± 1.3	122	260 9	
Experiment 3									
Pregnant	Carotene	7	247	10.5	4.2	22 ± 1.6	86	214 9	232 ± 12
Received 80 mcg. thyroxine daily	Carotene	8	214	9.4	4.4	21 ± 2.7	90	194 22	
Received 60 mcg. thyroxine daily	Carotene	8	200	7.7	3.8	30 ± 3.2	117	233 28	
Received 40 mcg. thyroxine daily	Carotene	8	190	6.5	3.2	23 ± 4.0	79	150 16	
Non-pregnant	Carotene	7	224	6.5	2.9	24 ± 2.9	69	154 24	
Pregnant	Vitamin A	6	238	9.6	4.0	39 ± 3.0	158	360 32	377 ± 31
Received 80 mcg. thyroxine daily	Vitamin A	8	205	7.9	3.8	57 ± 2.8	219	450 22	
Received 60 mcg. thyroxine daily	Vitamin A	8	216	7.7	3.6	50 ± 1.8	180	389 11	
Non-pregnant	Vitamin A	8	225	7.3	3.2	56 ± 2.4	182	410 19	

Vitamin A Per Gram Liver

When vitamin A per gram of liver is considered, it is evident that carotene-fed rats, pregnant or given 0.15 gm. dried thyroid or 80 or 40 mcg. thyroxine daily, had no significantly different storage from those of the non-pregnant control animals (Fig. 2). The group given 60 mcg. thyroxine daily showed a slight but significant rise in the liver vitamin A. It is possible that the 80 mcg. dosage of thyroxine was excessive, perhaps mildly toxic, and the 40 mcg. dosage insufficient to affect the carotene transformation and storage.

The livers of pregnant vitamin-A-fed rats on the other hand had smaller stores of vitamin A per gram than the non-pregnant controls and in most cases also less than the hyperthyroid groups. In all cases the liver vitamin A of the newly born litter was considered part of the pregnant groups' store (Table 2).

Vitamin A Per Liver

Significant differences in vitamin A per liver are seen between the pregnant and non-pregnant groups fed carotene in Experiment *2*, and also between hyperthyroid, 0.15 gm. dried thyroid daily, and the control or non-pregnant groups. The corresponding rats given vitamin A in this experiment did not exhibit such differences (Fig. 3).

Likewise, in Experiment *3*, there were significant differences in liver vitamin A between the pregnant and non-pregnant rats fed carotene and between the hyperthyroid animals receiving 80 or 60 mcg. thyroxine daily and the non-pregnant rats and those which received 40 mcg. thyroxine daily. The latter two groups were alike. The vitamin-A-fed rats in Experiment *3* showed no certain differences in liver vitamin A storage among any of the groups except for a possible slight rise in the animals which received 80 mcg. thyroxine daily.

Efficiency of Vitamin A and Carotene for Liver Storage of Vitamin A

The increase in liver size in the pregnant and hyperthyroid groups obscured the differences in vitamin A storage, when this storage was assessed as vitamin A per gram of liver. Since the intakes of both carotene and vitamin A were kept equal among the groups, the true comparative retentions may be seen more clearly if total vitamin A per liver is examined. This is the more reasonable, since there is no available evidence that size of liver governs its capacity to store vitamin A.

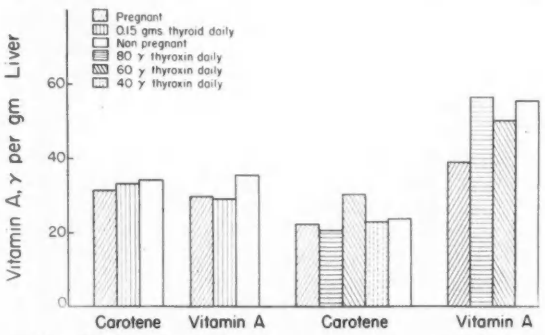


FIG. 2. *Vitamin A, in micrograms per gram of liver, of livers of pregnant, hyperthyrpoid, and non-pregnant rats given supplements of carotene and vitamin A.*

In Experiment *2* approximately the same amount of the vitamin, 0.236 to 0.307 mg., was found in the livers when a total of 21.5 mg. carotene or 1.68 mg. vitamin A was fed in forty-two days. This amounts to 1.1 to 1.4 per cent of the carotene and 15 to 17 per cent of the vitamin A intake. Even assuming that only one-half of the carotene was beta carotene, the ratio of efficiency of vitamin A to beta carotene for liver deposit under these conditions was more than five to one (Table 3). The increased retention as liver vitamin A of ingested carotene due to pregnancy and hyperthyroidism amounted to 28 to 57 per cent, whereas that of ingested vitamin A under the same circumstances varied from −8 to +10 per cent (Table 3). The latter represent statistically insignificant differences, the former significant differences.

As has been noted previously, however, there was little variation in the vitamin A stores of the litters under any of these conditions. In twenty-nine litters the average total liver vitamin A per litter was only 17 mcg., varying from 5 to 26 mcg. per litter with some tendency for the litters of the carotene-fed rats to exhibit the higher vitamin A contents.

Vitamin A Utilization in Pregnancy and Non-Toxic Hyperthyroidism

The retention of vitamin A by carotene-fed pregnant rats per liver and per 100 gm. body weight in all cases tended to be greater than that of comparable non-pregnant animals. Per gram of liver, the retention was nearly the same in the two groups. In vita-

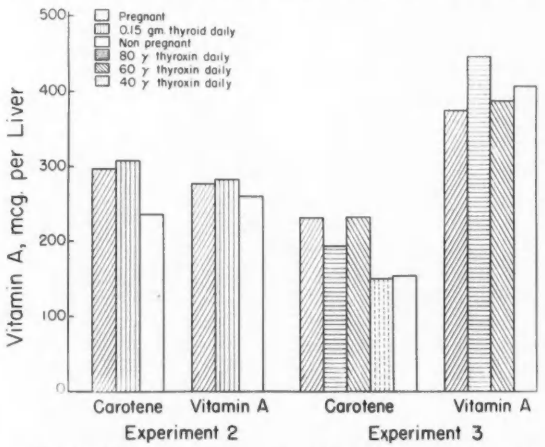


FIG. 3. *Vitamin A, in micrograms per liver, of pregnant, hyperthyroid, and non-pregnant rats given supplements of carotene and vitamin A.*

TABLE 3

Retention of ingested carotene and vitamin A in livers of pregnant, hyperthyroid, and non-pregnant rats

EXPERIMENT	GROUP	LIVER VITAMIN A	RETENTION	INCREASE OVER NON-PREGNANT RATS
	21.5 Mg. Total Carotene Supplement			
		mg.	%	%
2	Pregnant	0.297	1.4	28
	Received 0.15 mg. dried thyroxine daily	0.307	1.4	28
	Non-pregnant	0.236	1.1	—
3	Pregnant	0.232	1.1	57
	Received 80 mcg. thyroxine daily	0.194	0.9	29
	Received 60 mcg. thyroxine daily	0.233	1.1	57
	Received 40 mcg. thyroxine daily	0.150	0.7	0
	Non-pregnant	0.154	0.7	—
	1.68 Mg. Total Vitamin A Supplement			
2	Pregnant	0.277	16.5	7
	Received 0.15 gm. dried thyroid daily	0.284	17.0	10
	Non-pregnant	0.260	15.4	—
	1.70 Mg. Total Vitamin A Supplement			
3	Pregnant	0.377	22.2	−8
	Received 80 mcg. thyroxine daily	0.450	26.5	10
	Received 60 mcg. thyroxine daily	0.389	22.9	5
	Non-pregnant	0.410	24.1	—

min-A-fed pregnant rats the retention per liver was nearly the same in the two groups, but on the basis of per gram of liver and per 100 gm. body weight it was slightly greater in the non-pregnant animals. It would appear, therefore, either that there is little additional need for vitamin A imposed by pregnancy particularly when carotene is fed, or else the better utilization of carotene in pregnancy compensates adequately for any increased need. The rats which received carotene and sufficient but not excessive thyroid treatment retained more of the ingested vitamin supplement as vitamin A per liver and per 100 gm. body weight than did the non-pregnant controls. When vitamin A was fed, there was no consistent effect of the thyroid treatment except in one group given 80 mcg. thyroxine daily in which a measurable increase in liver vitamin A was seen. There was no consistent decrease, however, in the liver stores caused by hyperthyroidism. Under these conditions, treatment equivalent to 75 mg. dried thyroid or 30 to 40 mcg. thyroxine per 100 gm. body weight daily for twenty-one days produced an apparent decrease rather than an increase in the utilization of dietary vitamin A.

It has been generally assumed that pregnancy increases the need for vitamin A as it does for many other nutrients. Such increased requirement cannot be large in the rat, and the improved utilization of carotene which accompanies pregnancy along with increased organ size may compensate for this increased need.

Hyperthyroidism has also been thought to increase the utilization of vitamin A, but here, too, increases in organ size particularly of the liver may complicate the picture. Carotene is better utilized by hyperthyroid rats than by normal animals and in about the same manner shown by pregnant animals. Whether the similarity of conditions seen in these pregnant and hyperthyroid animals be due to coincidence, to increased thyroid activity in pregnancy, or to some other unidentified cause remains to be determined. There is still some question as to thyroid activity in pregnancy. According to the results of an assay of thyroxine production by pregnant and non-pregnant female rats made by Monroe and Turner (28), there is no increase in the secretion of this hormone due to pregnancy.

The hypertrophy of the liver of pregnant rats as shown in these experiments, and of other organs as well, reported by Poo *et al.* (1, 2) and recently seen also in our laboratory may account for the inexplicably large utilization of nitrogen, ascorbic acid, thiamine, niacin, and vitamin A which appears to characterize normal pregnancy.

It remains to be determined when the organ hypertrophy of pregnancy is reversed and whether the hypertrophy is cumulative with successsive pregnancies.

The question might be raised as to the wisdom of the attempts currently being made to reduce the weight of overweight pregnant women or to control the weight increases of normal sized pregnant women. An increase of approximately one-third in the liver tissue and probably the same in the case of the alimentary canal would involve the deposition of a considerable quantity of protein. Such excess retention of ingested protein in human pregnancy has been recognized for years and has been ascribed to storage in anticipation of the lactation demands, but the deposit may instead be required for normal and perhaps permanent hypertrophy of the liver and other organs. This increased protein need must be met in the pregnant women's diet and the accompanying adequate caloric provision required for protein utilization cannot be omitted without risk. There is doubt as to whether serious weight reduction can safely be attempted with pregnant women.

SUMMARY

The livers of pregnant rats were increased in weight 31 per cent above those of comparable non-

pregnant animals in three experiments totalling ninety rats. Similarly, fifty-five rats receiving non-toxic doses of dried thyroid or thyroxine for twenty-one days had 21 to 36 per cent heavier livers than the fifty controls. These comparisons are in terms of liver weight per 100 gm. body weight. The composition of the hypertrophied livers was normal as to water, fat, and nitrogen content. The pregnant animals had 4.3 per cent of their weight as liver; the hyperthyroid, 4.2 per cent; and the normal animals, 3.3 per cent.

On the same total intake of carotene, 21.5 mg. total for forty-two days following depletion, the pregnant rats retained in their own and their litter's livers more total vitamin A than did the non-pregnant controls. The same was true of the thyroid-treated rats. The distribution per gram of liver was not significantly changed by these conditions, due probably to the liver hypertrophy.

On identical intakes of vitamin A, 1.68 mg. total in forty-two days, there were no significant differences in total vitamin A per liver, but vitamin A per gram of liver appeared to be greater in the hyperthyroid and non-pregnant animals than in the pregnant rats. This was particularly marked in the thyroxine-treated groups which exhibited less liver hypertrophy than did those given dried thyroid.

The total retention of vitamin A in relation to intake was much greater in all the vitamin-A-fed animals than in those given carotene. In the former, 15.4 to 26.5 per cent of the smaller intake, 1.68 mg. vitamin A, was retained and in the latter only 0.7 to 1.4 per cent of 21.5 mg. intake of carotene.

The significance of these findings in relation to the diet of pregnant women is briefly discussed.

REFERENCES

(1) Poo, L. J., Lew, W., and Addis, T.: Protein anabolism of organs and tissues during pregnancy and lactation. J. Biol. Chem. 128: 69, 1939.

(2) Poo, L. J., Lew, W. Lee, D. D., and Addis, T.: Protein anabolism in the organs and tissues of pregnant rats at different levels of protein consumption. J. Nutrition 19: 505, 1941.

(3) Addis, T., Karnofsky, D., Lew, W., and Poo, L. J.: The protein content of the organs and tissue of the body after administration of thyroxine and dinitrophenol and after thyroidectomy. J. Biol. Chem. 124: 33, 1938.

(4) Johnson, R. M., and Baumann, C. A.: The effect of thyroid on the conversion of carotene into vitamin A. J. Biol. Chem. 171: 513, 1947.

(5) Kennaway, E. L., and Kennaway, N. M.: The ascorbic acid content of the liver in pregnant mice. Cancer Research 4: 704, 1944.

(6) Kennaway, E. L., and Tipler, M. M.: The ascorbic acid content of the liver in pregnant rats. Brit. J. Exper. Path. 28: 351, 1947.

(7) Teel, H. M., Burke, B. S., and Draper, R.: Vitamin C in human pregnancy and lactation. 1. Studies during pregnancy. Am. J. Dis. Child. 56. 1004, 1938.

(8) Byrn, J. N., and Eastman, N. J.: Vitamin A levels in maternal and fetal blood plasma. Bull. Johns Hopkins Hosp. 73. 132, 1943.

(9) Lund, C. J., and Kimble, M. S.: Plasma vitamin A and carotene of the newborn infant. With consideration of fetal-maternal relationships. Am. J. Obst. & Gyn. 46: 207, 1943.

(10) Lund, C. J., and Kimble, M. S.: Vitamin A during pregnancy, labor and the puerperium. Am. J. Obst. & Gyn. 46: 486, 1943.

(11) Bodansky, O., Lewis, J. M., and Lillienfeld, M. C. C.: The concentration of vitamin A in the blood plasma in pregnancy. J. Clin. Invest. 22: 643, 1943.

(12) Lewis, J. M., Bodansky, O., Lillienfeld, M. C. C., and Schneider, H.: Supplements of vitamin A and of carotene during pregnancy. Am. J. Dis. Child. 73: 143, 1947.

(13) Guerrant, N. B.: Influence of age and of vitamin A intake on the storage of vitamin A in the liver of the rat. J. Nutrition 37: 37, 1949.

(14) Abelin, I.: Uber die Beziehungen zwischen Carotin (Vitamin A) und Thyroxin. Ztschr. f. Physiol. Chem. 217: 109, 1933.

(15) Sure, B., and Buchanan, K. S.: Influence of hyperthyroidism on vitamin A reserves of the albino rats. J. Nutrition 13: 521, 1937.

(16) Logaras, G., and Drummond, J. C.: Vitamin A and the thyroid. Biochem. J. 32: 964, 1938.

(17) Baumann, C. A., and Moore, T.: Thyroxine and hypervitaminosis-A. Biochem. J. 33: 1639, 1939.

(18) Brown, E. F., and Morgan, A. F.: Nitrogen metabolism of the normal and the vitamin A-deficient rat as affected by thyroid administration. J. Nutrition 35: 439, 1948.

(19) Escamilla, R. F.: Carotinemia in myxedema. Explanation of the typical slightly icteric tint. J. Clin. Endocrinol. 2: 33, 1942.

(20) Mandelbaum, T., Candel, S., and Millman, S.: Hypothyroidism, hyperlipemia and carotenemia. J. Clin. Endocrinol. 2: 465, 1942.

(21) Kunde, M. M.: Studies on experimental cretinism. 3. Nutritional disturbances, pellagra and xerophthalmia. Proc. Soc. Exper. Biol. & Med. 23: 812, 1926.

(22) Drill, V. A., and Truant, A. P.: Effect of thyroidectomy on the conversion of carotene to vitamin A. Endocrinol. 40: 259, 1947.

(23) Wiese, C. E., Deuel, H. J., Jr., and Mehl, J. W.: Thiouracil and conversion of carotene to vitamin A measured by liver storage in the rat. Proc. Soc. Exper. Biol. & Med. 66: 213, 1947.

(24) Food and Nutrition Board: Recommended Dietary Allowances, Revised. National Research Council Reprint and Circ. Series, No. 129, October, 1948.

(25) Gallup, W. D., and Hoefer, J. A.: Determination of vitamin A in liver. Indust. & Engin. Chem., Anal. Ed. 18: 288, 1946.

(26) Hubbell, R. B., Mendel, L. B., and Wakeman, A. J.: A new salt mixture for use in experimental diets. J. Nutrition 14: 273, 1937.

(27) Addis, T., Lee, D. D., Lew, W., and Poo, L. J.: The protein content of the organs and tissues of the body on different levels of protein consumption. J. Nutrition 19: 199, 1940.

(28) Monroe, R. A., and Turner, C. W.: Thyroid secretion rate of albino rats during growth, pregnancy and lactation. College of Agriculture, Experiment Station, University of Missouri Research Bull. No. 403, 1946.

According to *The Trained Nurse*, in the year 80 A.D., the popular cure for indigestion was a dose of finely ground, cooled lava of the Mt. Vesuvius eruption, mixed with either food or wine.

Calculation of Diabetic Diets

Report of the Committee on Diabetic Diet Calculations, American Dietetic Association.[1] Prepared Cooperatively with the Committee on Education, American Diabetes Association, and the Diabetes Branch, U.S. Public Health Service

Compiled by
Elizabeth K. Caso[2]
Nutritionist, Diabetes Branch, U.S. Public Health Service, Boston

FOR A number of years the medical and dietetic professions have been aware of the following problems relative to the dietary treatment of the diabetic patient:

(a) Wide variability in food composition results in wide differences in figures used in computing.

(b) Methods used to estimate the composition of a diet may be prolonged and needlessly precise.

(c) Among clinical workers there are many inconsistencies in the inclusion or restriction of foods.

(d) Sizes of recommended portions may be stated in impractical amounts which are difficult for the patient to measure.

(e) Often the instructions to the patient are inadequate in content, particularly where insufficient time is spent in discussing the diet.

(f) In many instances the diets are not adjusted to the food habits of the individual, or so arranged that the patient will know how to plan his diet to fit different situations, such as restaurant meals or packed lunches.

Need for Standardization

Striker, in addressing the members of the American Dietetic Association in Cincinnati in 1946 (1), stressed the need for greater standardization of values on food composition in the dietary management of diabetes. He also pointed out that great benefits could be gained if consistent terminology were generally employed in dealing with food problems of diabetic patients.

The Diet Therapy Section of the American Dietetic Association has long been aware of these matters and as early as 1942 a committee was appointed to consider the selection of values on food composition suitable for use in dietary calculations and the degree of detail justifiable in the calculation of the diet.

Dr. Frank N. Allan expressed the need for simplified dietary material in a paper presented at the Annual Meeting of the American Dietetic Association in 1948. He stated that a large proportion of the two million diabetics in the United States receive little or no dietary treatment. He felt that some of the causes of inadequate diet therapy could be traced to the fact that present methods of diet calculation are too formidable and that there is often a lack of consecutive time for detailed dietary planning and instruction in private practice. Another difficulty is that social, economic, and psychologic factors are sometimes forgotten when planning with patients.

Wilkerson has outlined the role of the nutritionist in the program of the Diabetes Branch, U.S. Public Health Service (2). He, too, emphasized the need for uniformity and simplicity in dietary instruction if a program of education in diabetes for professional personnel and the general public is to be effective.

For the purpose of working towards the solution of these problems, the American Diabetes Association in 1947 invited the American Dietetic Association to select a committee to work jointly with its Committee on Education (3)[3]. Since the work of the Diabetes Branch of the U.S. Public Health Service

[1] Members of the Committee on Standardization of Food Analysis for Diabetic Calculation of the American Dietetic Association were: Hortense Allen, Elizabeth Caso, Doris Johnson, Marion Nichols, Helen Baughman, Jean Crooks, Ella Jane Meiller, Eva D. Wilson, and Dorothea F. Turner. The following served as consultants to the Committee: Martha Alderman Hunscher, Eloise R. Trescher, Kathryn Heitshu, Elsie Martin, Sister Euphemia, Elmira Blecha, Henrietta Rynbergen, and Anna Reimer. Eva Donelson Wilson and Doris Johnson served as chairmen of the committee successively.

[2] The assistance of Bernice K. Watt, Ph.D., Bureau of Human Nutrition and Home Economics, U. S. Department of Agriculture; George V. Mann, M.D., Harvard School of Public Health; and William H. Olmsted, M.D., Washington University School of Medicine, is greatly appreciated.

[3] Committee on Education of the American Diabetes Association, 1946–47: Frank N. Allan, M.D., Chairman; Don H. Duffie, M.D.; Alexander A. Marble, M.D., and Hugh L. C. Wilkerson, M.D. Committee on Education, 1947–48: Frank N. Allan, M.D., Chairman; Don H. Duffie, M.D., Alexander A. Marble, M.D.; Randall C. Sprague, M.D.; and Hugh L. C. Wilkerson, M.D.

is so intimately concerned with these matters, it joined in this project to become the third cooperating organization. The objectives of this joint committee were to prepare a set of representative values suitable for use in dietary calculation and to develop a simplified method for planning the diet, including several "exchange lists" of foods of similar food value.

The joint committee was faced with many difficulties due in part to a lack of uniformity in the composition of food occurring as a result of varietal differences, variations in conditions of growth, degree of maturity, and methods of harvesting, storage, or preparation. For example, two different types of peaches may vary as much as 125 per cent in carbohydrate content. The composition of a piece of well done meat will be roughly 25 per cent higher in protein than a piece which is rare, due to a difference in water content. The carbohydrate content of bread will fluctuate depending upon its age and the way it has been stored (4). McCance and Widdowson (5) have pointed out that an appreciable amount of carbohydrate may be lost in the cooking of vegetables. The majority of American food tables (6, 7) report "total carbohydrate" values which are considered to contain a varying percentage of unavailable carbohydrate (8). All of these factors had to be considered carefully and weighted in preparing figures for calculating diabetic diets.

On the other hand, there is a great variation from day to day in bodily requirements and utilization of food which is dependent on such factors as activity, emotional status, and insulin dosage. In fact, differences in bodily needs far exceed differences in food composition and, therefore, minimize the problem of the inevitable variation in food content. Thus, nothing more than reasonable detail is justifiable in calculating diabetic diets. As a result, foods have been grouped in terms of similarity in composition

Food Exchange Lists

Recognizing these facts, the joint committee has submitted the food values given in Table 1. As mentioned above, the list is greatly abbreviated by combining foods of similar composition into food exchange lists.

TABLE 1

Food values for calculating diabetic diets

GROUP	AMOUNT	WEIGHT	CARBOHYDRATE	PROTEIN	FAT	ENERGY
		gm.	*gm.*	*gm.*	*gm.*	*calories*
Milk, whole	½ pt.	240	12	8	10	170
Vegetable, Group A	as desired	—	—	—	—	—
Vegetable, Group B	½ cup	100	7	2	—	36
Fruit	varies	—	10	—	—	40
Bread exchanges	varies	—	15	2	—	68
Meat exchanges	1 oz.	30	—	7	5	73
Fat exchanges	1 tsp.	5	—	—	5	45

MILK

In rounded figures, the composition of 1 cup (8 oz.) of whole fresh milk averages 12 gm. carbohydrate, 8 gm. protein, and 10 gm. fat (7). One cup or ½ pt. is purposely used as the unit of measurement, since milk in most sections of this country is purchased by the quart. Thus ½ pt. is relatively easy for the patient to measure, and any multiple of ½ pt. can be figured into the meal plan for the day. This is much simpler than prescribing odd amounts, such as 7 or 14 oz. per day.

Several forms of cow's milk are available, such as, evaporated, dried, or skim milk. These types of milk have been combined into one table called the "Milk Exchange List" (Table 2). In the amounts listed one may be substituted for another since they are all approximately equal in composition.

PROBLEMS OF MEASURING CARBOHYDRATE

Innumerable lists have been prepared which classify vegetables according to the amount of carbohydrate they contain. In some instances vegetables have been divided into lists containing approximately 3, 6, 9, and 12 per cent carbohydrate. In others, they have been grouped as 5, 10, or 15 per cent vegetables. One author might place a vegetable in the 6 per cent group while another might include it in the 3 per cent list. There has been little uniformity in this matter. In addition, the percentage classification has been difficult for the patient to comprehend and to put into practical use.

In seeking some simpler manner of grouping the vegetables, the committee took into account the controversy regarding "total" and "available" carbohydrate. According to the Department of Agriculture (6) " 'total' carbohydrate in the majority of cases is reckoned as carbohydrate by difference, that is, as the difference between 100 per cent and the

TABLE 2

LIST 1—MILK EXCHANGES

Per serving: carbohydrate, 12 gm.; protein, 8 gm.; fat, 10 gm.

TYPE OF MILK	APPROXIMATE MEASURE	WEIGHT
		gm.
Whole milk (plain or homogenized)	1 cup (8 oz.)	240
Skim milk*	1 cup	240
Evaporated milk	½ cup	120
Powdered whole milk	¼ cup	35
Powdered skim milk (non-fat dried milk)*	¼ cup	35
Buttermilk (from whole milk)	1 cup	240
Buttermilk (from skim milk)*	1 cup	240

* Since these forms of milk contain no fat, two fat exchanges may be added to the diet when they are used.

sum of the percentages of water, protein, fat, and ash. This measure includes starch, dextrin, and sugars, and is to this extent an approximate measure of the total carbohydrate that can be utilized by the body. However, it tends to over-estimate the available carbohydrate since it also includes crude fiber and organic acids, when present, and any undetermined solids." The American Diabetes Association, upon the recommendation of W. H. Olmsted, has defined available carbohydrate as follows (8): "This term includes starch, dextrin, glycogen, glucose, fructose, galactose, sucrose, lactose, and maltose. It represents the portion of the carbohydrate of foods available to the human body for glycogen formation . . ." That organization feels that available carbohydrate is the preferred value for computing diabetic diets.

There is evidence to show that cellulose, hemicellulose, and gums are broken down by bacterial action in the human intestinal tract to form volatile fatty acids (8, 9) which do enter into glycogen formation. However, isotopic studies of the intermediary metabolism of volatile fatty acids (10–13) seem to indicate that they do not cause a *net* increase in the body's supply of glycogen.

The organic acids, chiefly malic and citric, are converted to glucose. In each case, two molecules of citrate or malate forms one of glucose. Altogether the total amount of glucose formed from organic acids is negligible (8).

These studies of the availability of fractions making up "total-carbohydrate-by-difference" are very complex. Bernice K. Watt of the Bureau of Human Nutrition and Home Economics, Department of Agriculture, feels that it may be a long time before the ideal in food analysis is reached, with not only quantitative data, but data on human utilization available for the separate components of the so-called "carbohydrate by difference".

The question then arises as to the advisability of using values for starch and sugar alone as the measure of the carbohydrate content of vegetables and fruits. Dr. Watt has stated, after reviewing data in the Bureau files, that for a fair number of fruits, the analyses for sugar and starch appear to be as representative of the product as were estimates of total carbohydrate. For some fruits and many vegetables this is not the case, since products selected for study of sugar or starch content were not always ordinary products, but were often selected for study because of some particular characteristic or condition of growth. The Department of Agriculture is currently accumulating considerable data on the carbohydrate fractions of foods.

Furthermore, McCance and Widdowson (5) report a loss of carbohydrate in the cooking process. Although the analyses were done on English foods and have not been, to any extent, carried out on American foods, at least the findings are significant and would tend to justify the use of lower values for carbohydrate content.

This whole problem resolves itself into the need for some practical basis to use for the calculation of carbohydrate in diabetic diets. After some consideration, the joint committee finally recommended the

TABLE 3

Carbohydrate content of vegetables per 100-gm. serving

FOOD	SOURCE OF REFERENCE		
	U.S. Dept. of Agriculture (6) (sugar and starch)	McCance and Widdowson (5)	Williams *et al.* (14)
List 2, Group A—Vegetable Exchanges			
	gm./100 gm.	*gm./100 gm.*	*gm./100 gm.*
Asparagus	1.7	1.1	—
Beans, string, young	2.6	2.9	5.8
Beet greens	0.5	—	—
Broccoli	1.9	0.4 (tops)	1.1
Brussels sprouts	—	1.7	2.6
Cabbage	3.5	3.0	2.5
Cauliflower	2.6	1.2	1.0
Celery	1.2	1.3	—
Chard	0.8	—	—
Chicory	0.2	—	—
Cucumber	2.6	1.8	—
Dandelion greens	0.9	—	—
Eggplant	—	3.1	—
Kale	1.4	—	—
Lettuce	1.6	1.8	1.4
Mushrooms	0	0	—
Mustard greens	0.4	0.9	—
Radishes	3.4	2.8	—
Spinach	0.3	1.4	0.7
Squash, summer	1.2	—	—
Tomatoes	3.4	2.8	1.6
List 2, Group B—Vegetable Exchanges			
Beets	9.6 (total CHO)	9.9	7.3
Carrots	7.5	5.4	6.0
Onions	7.2	5.2	—
Peas, green	9.0	10.6	8.3
Pumpkin	5.1	3.4	—
Rutabaga	6.7	—	—
Squash, winter	4.9	—	—
Turnip	4.6	3.8	3.5
List 4—Bread Exchanges			
Beans, baked	18.8	17.3	—
Beans, dried	62.1 (total CHO)	—	—
Beans, Lima	23.5	—	—
Corn	18.9	—	14.8
Parsnips	11.9	11.3	—
Peas, dried	45.1	50.0 (raw) 19.1 (cooked)	—
Potato, white	15.6	18.3	16.4
Potato, sweet	25.6	20.1	23.7

figures for starch and sugar as representative of available carbohydrate, even though they may be short of the ideal.

CLASSIFICATION OF VEGETABLES

In Table 3 are summarized the data used to arrive at a simplified grouping of the more commonly used vegetables.

The first group of vegetables (Group A) contains 3 gm. or less of carbohydrate per 100-gm. serving. Therefore, the committee recommends that these vegetables be grouped in one list (Table 4) and that the negligible amount of carbohydrate which they contain need not be figured in the diet unless more than 200 gm. is used at a meal.

The second group of vegetables in Table 3 contain more carbohydrate. Some of them are more popular than others. Therefore, a weighted average was taken (Table 5), and, based on these data, the committee decided to figure the composition of these vegetables as 7 gm. carbohydrate and 2 gm. protein per 100-gm. serving.

Although the list of Group B vegetables is short, it contains some of the more popular vegetables. However, it is not likely that more than one of these vegetables would be eaten in one day. The dietitian who has previously figured three or more vegetables in the diet may now find that she needs to calculate only one Group B vegetable and allow the patient other vegetables from Group A as desired.

The remainder of the vegetables in Table 3 contain appreciably more carbohydrate. For simplicity they are included in the list of bread exchanges and will be considered later.

TABLE 4

LIST 2—VEGETABLE EXCHANGES

Group A

Negligible carbohydrate, protein, and calories if 1 cup (200 gm.) or less is used

Asparagus	Eggplant	Lettuce
Beans, string, young	Greens*	Mushrooms
Broccoli*	Beet greens	Okra
Brussels sprouts	Chard, Swiss*	Pepper*
Cabbage	Collard	Radish
Cauliflower	Dandelion	Sauerkraut
Celery	Kale	Squash, summer
Chicory*	Mustard	Tomatoes*
Cucumbers	Spinach	Watercress*
Escarole*	Turnip greens	

Group B

Per serving: carbohydrate, 7 gm.; protein, 2 gm. (1 serving = ½ cup = 100 gm.)

Beets	Peas, green	Squash, winter*
Carrots*	Pumpkin*	Turnip
Onions	Rutabaga	

* These vegetables have high vitamin A value. At least one serving should be included in the diet each day.

This new classification of vegetables will need to be re-evaluated in a year or two, to determine its practicability. None of the other lists represents as major a change as this new classification of vegetables (Table 4).

FRUIT

The carbohydrate content of fruit differs with the variety as in vegetables, and fruits have been classified into groups according to their carbohydrate content. To avoid the confusion of having several groups and to simplify dietary instruction for the patient, the practice in the past few years (17, 18) has been to list all fruits together in *amounts* that would supply either 10 or 15 gm. carbohydrate. The committee working on the material was in favor of the list (Table 6) which contained 10 gm. carbohydrate, since it presented the majority of the more common fruits in serving-sizes that are easy to purchase, economical to serve, and relatively satisfying in amount. The carbohydrate values of the fruits are based on the starch and sugar analyses of the Department of Agriculture (6). For practicality the figures were rounded.

In Table 7 the fruits have been listed in household measurements. Since each fruit in the amount listed contains approximately 10 gm. carbohydrate, one may be exchanged for the other. There is some variation between measured and weighed portions of fruit. Every so-called small apple will not weigh exactly 80 gm. Here again, however, the variation seems reasonable on the basis of the difference in actual carbohydrate content of each food.

BREAD, CEREALS, AND VEGETABLES OF HIGH CARBOHYDRATE CONTENT

Again, it was obvious that if many foods of high carbohydrate content could be included in the one

TABLE 5

Data used to calculate the composition of Vegetables Group B

FOOD	CARBOHYDRATE CONTENT (starch and sugar)*	WEIGHTING (based on usual rate of consumption)†
	gm./100 gm.	
Beets	8.0	3
Carrots	7.5	4
Onions	7.2	1
Peas, green (medium)	9.0	4
Pumpkin	5.1	—
Rutabaga	6.7	½
Squash, winter	4.9	2
Turnip	4.6	1

* U. S. Department of Agriculture figures (6).

† From "Family Food Consumption in the United States" (15) and "Consumption of Food in the United States, 1909–1948" (16).

list of bread exchanges, it would be much easier for all those concerned with the planning of diabetic diets. Many lists of this sort have been prepared by other groups. The joint committee agreed upon the list given in Table 8 which includes several types of breadstuffs, a number of cereals, different varieties of crackers, and the vegetables with the highest carbohydrate content as shown in Table 3.

Although the average slice of bread may weigh 25 gm. and contain approximately 13 gm. carbohydrate, it was decided that it would be preferable to list all of the foods in this list in amounts that contain approximately 15 gm. carbohydrate. A ½-cup serving of many of these foods, which is an easy quantity to measure, yields this amount of carbohydrate. During the course of a day, an individual who is allowed six bread exchanges, for example, is likely to select several different foods from List 4, such as potato, cereal, or crackers. The average typical day's consumption of bread exchanges is, therefore, approximately 15 gm. carbohydrate per serving.

TABLE 6

Grams of fruit supplying 10 gm. carbohydrate

FOOD	SOURCE OF REFERENCE	
	U.S. Dept. of Agriculture (6)	Joint Committee's recommendations
	gm.	*gm.*
Apple	97	80
Applesauce	126	100
Apricots, fresh	96	100
Apricots, dried	22	20
Banana	52	50
Blackberries	164	150
Blueberries	103	100
Canteloupe	238	200
Cherries	75	75
Dates	16	15
Figs, fresh	62	50
Figs, dried	18	15
Grapefruit	154	125
Grapefruit juice	118	100
Grapes	67-87	75
Grape juice	60	60
Honeydew	143	150
Mango	73	70
Orange	113	100
Orange juice	111	100
Papaya	111	100
Peach	114	100
Pear	112	100
Pineapple	84	80
Pineapple juice	83	80
Plums	120	100
Prunes, dried	24	25
Raisins	16	15
Raspberries	139	150
Strawberries	189	150
Tangerines	115	100
Watermelon	167	175

MEAT, FISH, POULTRY, EGGS, AND CHEESE

The foods which are high in protein have been listed in amounts that are equal approximately in protein and fat content to 1 oz. meat. It was noted earlier that the method or preparation or the cut of the meat (rib or rump) will influence the protein and fat content. Also, some forms of cheese are higher in fat than others as a result of the type of milk (whole or skim) used in their preparation. Some varieties of fish (cod versus mackerel) contain more fat than others. In a mixed diet, these differences become minimized. After reviewing the dietary analyses of these foods, the committee recommended the list of meat exchanges given in Table 9 and the figures of 7 gm. protein and 5 gm. fat per unit of exchange.

Diets which include odd amounts of meat such as 75 or 105 gm. are difficult to measure. Servings of 1, 2, or 3 oz., for example, are more practical for the patient, since the food is usually purchased in these amounts. This factor was taken into consideration in preparing this list.

TABLE 7

LIST 3—FRUIT EXCHANGES*

Carbohydrate—10 gm. per serving

FOOD	APPROXIMATE MEASURE
Apple (2-in. diameter)	1
Applesauce	½ cup
Apricots	
Fresh	2 medium
Dried	4 halves
Banana	½ small
Blackberries	1 cup
Raspberries	1 cup
Strawberries†	1 cup
Cantaloupe (6-in. diameter)†	¼
Cherries	10 large
Dates	2
Figs, fresh	2 large
Figs, dried	1 small
Grapefruit†	½ small
Grapefruit juice†	½ cup
Grapes	12
Grape juice	½ cup
Honeydew melon (7-in. diameter)	⅛
Mango	½ small
Orange†	1 small
Orange juice†	½ cup
Papaya	½ medium
Peach	1 medium
Pineapple	½ cup
Pineapple juice	⅓ cup
Plums	2 medium
Prunes, dried	2 medium
Raisins	2 Tbsp.
Tangerine	1 large
Watermelon	1 cup

* Unsweetened canned fruits may be used in the same amount as listed for the fresh fruit.

† These fruits are rich sources of ascorbic acid. At least one serving should be included in the diet each day.

TABLE 8

LIST 4—BREAD EXCHANGES

Per serving: carbohydrate, 15 gm.; protein, 2 gm.

FOOD	APPROXIMATE MEASURE	WEIGHT
		gm.
Bread	1 slice	25
Biscuit, roll (2-in. diameter)	1	35
Muffin (2-in. diameter)	1	35
Cornbread (1½-in. cube)	1	35
Flour	2½ Tbsp.	30
Cereal		
Cooked	½ cup	100
Dry (flake and puffed)	¾ cup	20
Rice and grits, cooked	½ cup	100
Spaghetti and noodles, cooked	½ cup	100
Crackers		
Graham (2½-in. square)	2	20
Oysterettes	20 (½ cup)	20
Saltines (2-in. square)	5	20
Soda (2½-in. square)	3	20
Round, thin (1½-in. diameter)	6–8	20
Vegetables		
Beans and peas, dried, cooked (Lima, navy, split pea, cowpeas)	½ cup	100
Beans, Lima, fresh	½ cup	100
Beans, baked, no pork	¼ cup	50
Corn, sweet	⅓ cup	80
Corn, popped	1 cup	20
Parsnips	⅔ cup	125
Potatoes, white—baked or boiled (2-in. diameter)	1	100
Potatoes, white—mashed	½ cup	100
Potatoes, sweet or yams	¼ cup	60
Sponge cake, plain (1½-in. cube)	1	25
Ice cream (omit 2 Fat Exchanges)	½ cup	70

TABLE 9

LIST 5—MEAT EXCHANGES

Per serving: protein, 7 gm.; fat, 5 gm.

FOOD	APPROXIMATE MEASURE	WEIGHT
		gm.
Meat and poultry, medium fat (beef, lamb, pork, liver, chicken)	1 oz.	30
Cold cuts (4½-in. square, ⅛-in. thick)	1 slice	45
Frankfurter (8 or 9 per lb.)	1	50
Fish		
Cod, mackerel	1 oz.	30
Salmon, tuna, crab	¼ cup	30
Oysters, shrimp, clams	5 small	45
Sardines	3 medium	30
Cheese		
Cheddar or American	1 oz.	30
Cottage	¼ cup	45
Egg	1	50
Peanut butter*	2 Tbsp.	30

* Limit use or adjust carbohydrate (deduct 5 gm. carbohydrate per serving when used in excess of one exchange).

FATS

The problem of arriving at a figure for the composition of fats was relatively simple, since there are fewer variable factors involved. The joint committee accepted the value of 5 gm. fat per fat exchange. The list (Table 10) contains foods that are approximately equal in fat content.

These six exchange lists (Tables 2, 5, 7, 8, and 9) will allow the patient great variety in his diet and permit him to select foods from the different groups that may suit his income and food habits. The lists should also help to establish some uniformity in dietary instruction and counteract a practice that has no scientific basis, that of excluding various foods, such as potato, certain fruits, and some other foods, from the diet.

SPECIAL CONSIDERATIONS

The following foods contain negligible amounts of carbohydrate, protein, and fat. Therefore, they may be used as desired in the diet.

Coffee	Rhubarb
Tea	Mustard
Clear broth	Pickles, sour
Bouillon	Pickles, dill-unsweetened
Gelatin, unsweetened	Saccharine
Rennet tablets	Pepper
Cranberries	Spices
Lemon	Vinegar

"Specialty" foods for diabetic patients are not recommended. They are expensive, the information on the package is often misleading, and the patient can usually eat all the natural foods (breads, cereals, unsweetened fruits, vegetables) in the amount specified in his diet outline.

Calculation of the Diabetic Diet

By using the short list of food values given in Table 1, it will be possible to calculate diet prescriptions with considerable ease and simplicity, taking into account the amount of each of these food groups

TABLE 10

LIST 6—FAT EXCHANGES

Fat—5 gm. per serving

FOOD	APPROXIMATE MEASURE	WEIGHT
		gm.
Butter or margarine	1 tsp.	5
Bacon, crisp	1 slice	10
Cream		
Light, 20%	2 Tbsp.	30
Heavy, 40%	1 Tbsp.	15
Cream cheese	1 Tbsp.	15
French dressing	1 Tbsp.	15
Mayonnaise	1 tsp.	5
Oil or cooking fat	1 tsp.	5
Nuts	6 small	10
Olives	5 small	50
Avocado (4-in. diameter)	⅛	25

which the patient should eat. This simplicity in calculating a diet will result in the saving of time for both the physician and dietitian. The patient will also benefit immeasurably by a diet that is made to suit his food habits. Variety in the diet will be achieved by using the food exchange lists (Tables 2, 5, 7, 8, and 9).

Nutritive adequacy of the diet will be assured by including the same *basic protective foods* that are recommended for the normal individual. These include:

Milk	1 pt. for adults; 1 qt. for children
Meat, fish, poultry, eggs, and cheese	4–5 oz.
Whole grain or enriched cereal or bread	to meet caloric needs
Fruit—one a citrus fruit or tomato	2 servings
Vegetables—one green or yellow	2 servings
Butter or fortified margarine	to meet caloric needs

The actual calculation of the diet can be reduced to a simple formula, as shown in the accompanying box. To determine the number of servings of bread, meat, and fat exchanges required to complete the diet prescription, it is necessary only to:

(a) Subtract the number of grams of carbohydrate (61 in the example in the box) furnished by the other sources of carbohydrate from the amount prescribed (180) and divide the result by 15, the number of grams of carbohydrate in one serving of bread exchange as noted in List 4.

(b) The amount of protein in the diet may be adjusted to the prescription by subtracting the number of grams of protein (34 in the example) supplied by milk, vegetables, and bread exchanges from the amount prescribed (80) and dividing the remainder by 7, the amount of protein in each meat exchange.

(c) Follow the same procedure with regard to fat, except to divide the result by 5, the number of grams of fat in one serving as noted in List 6.

The diet is figured to coincide as closely as possible with the prescription. However, it is not practical to split bread or meat exchanges into halves or to add extra fruits and vegetables if the patient doesn't care for larger amounts. Therefore, the carbohydrate may vary as much as 7 gm. from the amount ordered and the protein may differ by 3 gm. The fat will agree closely with the prescription, since the figures for fat are all in multiples of five.

Procedure for Calculating a Diabetic Diet (19)

Sample Prescription

Carbohydrate	180 gm.
Protein	80 gm.
Fat	70 gm.
Calories	1700

	AMOUNT	CARBOHYDRATE gm.	PROTEIN gm.	FAT gm.
Milk, whole (List 1)	1 pt.	24	16	20
Vegetables (List 2, Group A)	as desired	—	—	—
Vegetables (List 2, Group B)	1 serving	7	2	—
Fruit (List 3)	3 servings	30	—	—
Total carbohydrate from sources other than bread exchanges		61		
180 gm. carbohydrate in prescription − 61 gm. from sources other than bread exchanges 119 ÷ 15 = 8 bread exchanges				
Bread exchanges (List 4)	8 servings	120	16	
Total protein from sources other than meat exchanges			34	
80 gm. protein in prescription −34 gm. from sources other than meat exchanges 46 gm. ÷ 7 = 7 meat exchanges				
Meat exchanges (List 5)	7 servings		49	35
Total fat from sources other than fat exchanges				55
70 gm. fat in prescription −55 gm. from sources other than fat exchanges 15 gm. ÷ 5 = 3 fat exchanges				
Fat exchanges (List 6)	3 servings			15
		181	83	70

TABLE 11

Caloric levels of sample meal plans

MEAL PLAN	CARBOHYDRATE	PROTEIN	FAT	ENERGY
	gm.	*gm.*	*gm.*	*calories*
1	125	60	50	1200
2	150	70	70	1500
3	180	80	80	1800
4	220	90	100	2200
5*	180	80	80	1800
6*	250	100	130	2600

* Planned particularly for children.

TABLE 12

Total day's food in sample meal plans

MEAL PLAN	MILK	VEGETABLE EXCHANGES		FRUIT EXCHANGES	BREAD EXCHANGES	MEAT EXCHANGES	FAT EXCHANGES
		Group A	Group B				
1	1 pt.	as desired	1	3	4	5	1
2	1 pt.	as desired	1	3	6	6	4
3	1 pt.	as desired	1	3	8	7	5
4	1 pt.	as desired	1	4	10	8	8
5	1 qt.	as desired	1	3	6	5	3
6	1 qt.	as desired	1	4	10	7	11

Division of Food Into Meals

Division of the total amount of food prescribed into meals should be worked out with the patient. In doing this, several factors must be considered:

(a) Present meal patterns which are usually related to such factors as occupation, working hours, and place of eating.

(b) Diabetic condition, i.e. tendency to excrete more or less sugar at varying times during the day.

(c) Type of insulin—regular, protamine zinc, globin.

The carbohydrate content of the diet should be divided between the meals avoiding too large a proportion of the total at any one meal. When protamine insulin is used, nourishment at bedtime (perhaps one seventh of the day's allowance of carbohydrate) should be recommended. When globin insulin is used, also give an afternoon lunch (approximately one seventh) and reduce the carbohydrate of the breakfast to about the same amount.

A good source of protein should be included at each meal (milk, eggs, meat, fish, or cheese). The fat is apt to divide itself naturally with fairly even distribution throughout the meals.

SAMPLE MEAL PLANS

This simplified method of calculating a diabetic diet just described is recommended, since it is the procedure most likely to make certain the diet is adjusted to the food preferences of the individual. "Diet lists" prepared in advance can be used for convenience, provided they are modified to suit the special needs of the individual. For this reason six sample meal plans (Tables 11 and 12) were prepared by the committee. They were planned to meet different caloric levels with different amounts of protein, fat, and carbohydrate. Meal Plans 1, 2, 3, and 4 are for adults. Meal plans 5 and 6 contain more milk and are especially suitable for children.

Use of These Figures

Since these figures for calculating the diabetic diet and food exchange lists have been recommended by all three of the cooperating agencies (20), the material is receiving widespread interest. To date several groups have reported that they are anticipating including it in hospital diet manuals and diet forms for ambulatory patients.

The Diabetes Branch of the U. S. Public Health Service has incorporated these exchange lists, figures for calculating the diet, and sample diet plans in an illustrated pamphlet entitled "Meal Planning." Single complimentary copies of this booklet may be obtained by writing to 695 Huntington Avenue, Boston 15. Additional copies may be purchased from the Health Publications Institute, Inc., Raleigh, North Carolina, for 5 cents a copy. The Diabetes Branch will also have available in July a series of colored film strips with sound recordings suitable for use in the group teaching of professional and lay people. The series on nutrition includes a practical presentation of the food exchange lists. These film strips have been prepared in cooperation with the American Dietetic Association and the American Diabetes Association.

Summary

This paper presents the results of the cooperative effort of the American Diabetes Association, the American Dietetic Association, and the Diabetes Branch, U. S. Public Health Service to prepare a set of food values for figuring diabetic diets, a short method for calculating the diet, and several lists of foods of similar food value.

REFERENCES

(1) Standard food analysis in relation to diabetes. J. Am. Dietet. A. 23: 774, 1947.

(2) WILKERSON, H. L. C.: The nutritionist's role in a diabetes control program. J. Am. Dietet. A. 24: 194, 1948.

(3) Report of the Committee on Education, American Diabetes Association: Proc. Am. Diabetes A. 7: 121, 1947.

(4) Calculation of diabetic diets. J. Am. Dietet. A. 24: 218, 1948.

(5) MCCANCE, R. A., AND WIDDOWSON, E. M.: Chemical composition of foods. 2nd ed. Brooklyn, N. Y.: Chemical Publishing Co., Inc., 1947.

(6) CHATFIELD, C., AND ADAMS, G.: Proximate composition of American food materials. U.S.D.A. Misc. Circ. No. 549, 1940.

(7) BUREAU OF HUMAN NUTRITION AND HOME ECONOMICS

in cooperation with NATIONAL RESEARCH COUNCIL: Tables of food composition in terms of eleven nutrients. U.S.D.A. Misc. Pub. No. 572, 1945.

(8) OLMSTED, W. H.: The available carbohydrate of fruits and vegetables. Proc. Am. Diabetes A. 9: 385, 1949.

(9) HUMMEL, F. C., SHEPHERD, M. L., AND MACY, I. G.: Disappearance of cellulose and hemicellulose from the digestive tracts of children. J. Nutrition 25: 59, 1943.

(10) BUCHANAN, J. M., AND HASTINGS, A. B.: The use of isotopically marked carbon in the study of intermediary metabolism. Physiol. Rev. 26: 120, 1946.

(11) BLOCH, K.: The metabolism of acetic acid in animal tissues. Physiol. Rev. 27: 574, 1947.

(12) WOOD, H. G.: The fixation of carbon dioxide and the inter-relationships of the tricarboxylic acid cycle. Physiol. Rev. 26: 198, 1946.

(13) STADIE, W. C.: The intermediary metabolism of fatty acids. Physiol. Rev. 25: 395, 1945.

(14) WILLIAMS, R. D., WICKS, L., BIERMAN, H. R., AND OLMSTED, W. H.: Carbohydrate values of fruits and vegetables. J. Nutrition 19: 593, 1940.

(15) BUREAU OF HUMAN NUTRITION AND HOME ECONOMICS: Family food consumption in the United States, spring 1942. U. S. D. A. Misc. Pub. No. 550, 1944.

(16) BUREAU OF HUMAN NUTRITION AND HOME ECONOMICS: Consumption of Food in the United States. 1909–48. U. S. D. A. Misc. Pub. No. 691, 1949.

(17) STERN, F.: Applied Dietetics. 3rd ed. Baltimore: Williams & Wilkins Co., 1949.

(18) TURNER, D. F.: Handbook of Diet Therapy. Chicago: University of Chicago Press, 1946.

(19) CASO, E. K., AND STARE, F. J.: Simplified method for calculating diabetic diets. J.A.M.A. 133: 169, 1947.

(20) Revised tables of food values. Proc. Am. Diabetes A. 9: 403, 1949.

When Do Dietitians Decide on Their Careers?

To avoid duplication of effort, the following committees of the Minnesota Dietetic Association planned their work together this year: Vocational Guidance, Exhibit, Publicity, and Public Relations. The special project undertaken by the Public Relations Committee, with the assistance of the other three committees, was a survey of the members of the Minnesota Association to learn when they had decided upon their professional career. About 70 per cent responded.

The results of the survey show that 21 per cent chose their profession in their senior year in high school, 17 per cent in their freshman year at college, 18 per cent in their sophomore year at college, 9 per cent when they were juniors in high school, and 10 per cent when they were high school sophomores. A small percentage decided after the sophomore year in college because they were dissatisfied with an earlier choice, such as medicine, when they found it was too long a course.

Those deciding earlier than the senior year in high school gave a variety of reasons for their choice, but it usually meant they had had contact with a hospital either as a patient or as a frequent visitor. They may have had a relative who was a hospital employee or the family doctor had influenced them. The three-year period including the last year of high school and the first two years of college, when 65 per cent decided upon their profession, indicates that the vocational guidance work of dietitians may be having some influence. However, many stated that they chose dietetics because they liked foods work and did not want to teach. Others chose this profession because they liked nutrition and chemistry; still others were influenced by their mothers, some other relative, or close friend. All of these reasons may not always be credited to the efforts of members in the profession.

The survey certainly indicated the need to begin vocational guidance work in the high school, since that is when the largest percentage made their decisions. Then, too, other professions are also trying to reach this group, and we must inform the girls of what our profession has to offer before they have decided on something else. Certainly the need for publicity for the profession and vocational guidance was revealed, for there are still many girls entering college who have never heard of dietetics.

In relation to the persons in the profession who are most effective in interesting girls in dietetics, the survey revealed that it is the younger dietitian who should participate in career days and programs on vocations. The very young girl preparing for a career can picture herself professionally employed up to twenty-five years of age, but not at forty-five. It was also apparent that more dietitians must appear on guidance programs, for even in the smallest high schools, the publicity of our profession cannot be left entirely to the vocational guidance instructor who has many professions and occupations to sell. *Harriett S. Warmington, Chairman of Public Relations, Minnesota Dietetic Association.*

Effect of Adding Soy Flour upon the Protein Value of Baked Products[1]

MAY S. REYNOLDS and CHRISTINE HALL[2]

Department of Home Economics, University of Wisconsin, Madison

THE supplementary value of soy protein for white flour protein in mixtures of the flours or in bread has been demonstrated by a number of investigators. Early work has been reviewed by Horvath (1) and by Jones and Divine (2). Much of the recent work has been reviewed by Carlson, Hafner, and Hayward (3). The possibility of expanding the benefits derived from the mutual supplementation of soy and wheat flour prompted this study of the value of incorporating soy flour in some additional baked products.

MATERIALS AND METHODS

Rat Growth Studies

Baked products were prepared according to the formulas appearing in Table 1 and were air-dried and ground. All nitrogen analyses were made by the macro-Kjeldahl-boric acid method (4). Protein was calculated as N × 6.25. Fat analyses were made by acid hydrolysis according to the method of the Association of Official Agricultural Chemists (5). The remainder was expressed as carbohydrate, although it is recognized that a slight error in carbohydrate value is introduced in this way. The percentage composition of the baked products, as determined (Table 2), formed the basis for the rat rations.

The baked products constituted the sole source of protein in the rations. The composition of the ration containing the soy flour product was, in each case, adjusted to equal that of the non-supplemented product by the addition of necessary amounts of Cerelose and vegetable oil. Vitamin-free casein and powdered whole eggs were sources of protein for the control rations and furnished protein equivalent in amount to the least amount found in any baked product (6.0 per cent). Rations were prepared in lots of 1 kg. and kept in sealed glass jars under refrigeration. The composition of the rations is presented in Table 3.

Male rats of the Sprague-Dawley strain, 6 in each of 12 groups, 3 to 4 weeks old, and weighing 40 to 50 gm., were used. At the beginning of the experiment, two rats were sacrificed, and the carcasses, with the contents of the digestive tracts removed, were frozen for later analysis. Rats were individually housed in raised, screen-bottomed cages with paper under them to facilitate recovery of spilled food. Daily food consumption records were kept. Fresh food was offered daily to avoid rancidity. Growth studies were continued for seven weeks.

"Protein efficiency" was calculated as the grams gain in weight per gram of protein eaten. "Nitrogen storage efficiency" designates the grams gain in body nitrogen per gram of nitrogen consumed. Gain in body nitrogen was determined as the difference between the nitrogen content of the rat bodies at the conclusion of the experiment and that of representative rats killed for analysis at the beginning of the feeding period. The contents of digestive tracts were removed, and the rat bodies were prepared for analysis by the method of Stearns (6).

Nitrogen Balance Studies on Human Subjects

The effect of soy flour on the value of the proteins of yellow cake was further investigated by nitrogen balance studies using human subjects. The same formulas used for making cake in the rat growth study were used in this phase of the investigation. The subjects were five students, four women and one man, ranging in age from twenty to twenty-seven years. These students carried on their usual activities throughout the experiment.

The two experimental periods consisted of: (a) a four-day preliminary depletion period followed by (b) ten days on the experimental diet, one day of which was preliminary to collections. During the four-day preliminary period, the diet furnished only

[1] The data in this paper were taken from the thesis of Christine Hall, submitted in partial fulfillment of the requirements for the degree of Master of Science. Part of the data were reported at the meeting of the American Home Economics Association in June, 1948, in Minneapolis. This work was supported in part by a grant from the Soy Flour Association. Published with the approval of the Director of the Wisconsin Agricultural Experiment Station. Received for publication November 8, 1949.

[2] Present address: Assistant Professor of Foods and Nutrition, Division of Home Economics, Tennessee Agricultural and Industrial State College, Nashville.

TABLE 1

Formulas of baked products

INGREDIENTS	WHITE CAKE		YELLOW CAKE		DEVIL'S FOOD CAKE		SUGAR COOKIES		PASTRY (PIE CRUST)	
	Plain	Soy flour	Plain	Soy flour	Plain	Soy flour	Plain	Soy flour	Plain	Soy flour
	gm.	*gm.*	*gm.*	*gm.*	*gm.*	*gm.*	*gm.*	*gm.*	*gm.*	*gm.*
Cake flour	500	500	500	500	500	500	—	—	—	—
All-purpose flour	—	—	—	—	—	—	450	450	500	500
Shortening	275	275	250	250	200	200	135	135	250	250
Sugar	650	650	650	650	625	625	293	293	—	—
Dried skim milk	60	60	60	60	45	45	—	—	—	—
Salt	15	15	15	15	17.5	17.5	5	5	7.5	7.5
Baking powder	30	32	30	30	—	—	11	11	—	—
Soy flour, defatted*	—	30	—	—	—	50	—	—	—	—
Soy flour, full fat†	—	—	—	30	—	—	—	45	—	50
Water	400	445	450	480	600	650	101	130	150	150
Frozen egg white	375	375	—	—	—	—	—	—	—	—
Whole egg	—	—	300	300	250	250	68	68	—	—
Cocoa	—	—	—	—	75	75	—	—	—	—
Soda	—	—	—	—	6	6	—	—	—	—

* Furnished by Archer-Daniels-Midland Company, Minneapolis.

† Furnished by Spencer Kellogg and Sons, Inc., Decatur, Illinois.

8 gm. protein per day. It has been reported by Hegsted *et al.* (7) that a period on a very low protein intake decreases the time needed to establish nitrogen equilibrium.

The experimental diet furnished approximately 0.42 gm. protein per kilogram of body weight per day, for each subject. Of the total protein, 80 per cent was furnished by the cake and the remaining 20 per cent by other vegetable proteins. Forty calories per kilogram body weight were supplied. This was an amount sufficient to maintain body weight as shown by the fact that the weights of the subjects varied no more than 0.9 kg. throughout either experimental period. The composition of the diets is given in Table 4.

The constituents of the diet were distributed in three meals per day, and a uniform intake was maintained. Cake was eaten at the noon and evening meals. It has been shown by Cannon (8) and more recently by Leverton (9) that the distribution of amino acids affects their value in the body.

Twenty-four-hr. urine collections were made throughout the nine-day test period. Fecal collections were made in three-day periods, with the aid of carmine markers. Food aliquots were saved for each three-day period.

RESULTS AND DISCUSSION

Rat Growth Studies

The results of the rat growth studies are shown in Table 5 and Figure 1. The superior growth of the group of rats fed dried egg as a source of protein is in keeping with the reports of Sumner (10), Willman *et al.* (11), and Bricker and Mitchell (12) in which they assign a high value to eggs as a source of protein.

The growth performance, protein efficiency, and nitrogen storage efficiency of the rats receiving soy-supplemented products was superior in every case to that of the rats receiving non-supplemented products. In the cakes, small amounts of milk and egg proteins undoubtedly served to improve the quality of wheat flour proteins, but soy flour brought about further improvement. Like the other cakes, the soy-devil's cake was superior by all methods of measurement to the cake without soy flour. However, although the percentage composition of the devil's cake did not differ greatly from that of the yellow cake, the growth, protein efficiency, and nitrogen storage efficiency were all markedly lower in the former. One obvious explanation is the presence of cocoa. Studies have been reported in which cocoa in foods has interfered with the utilization of calcium (13), phosphorus (14), and protein (15) in young rats. Negative results have also been reported.

TABLE 2

Percentage composition of baked products

BAKED PRODUCT	PROTEIN	FAT	CARBOHYDRATE (BY DIFFERENCE)
	%	%	%
White cake without soy flour	6.31	17.50	76.19
White cake with soy flour	7.00	17.50	75.50
Yellow cake without soy flour	6.75	18.80	74.45
Yellow cake with soy flour	7.25	19.63	73.12
Devil's food cake without soy flour	6.75	18.30	74.95
Devil's food cake with soy flour	8.25	17.50	74.25
Sugar cookies without soy flour	6.68	15.34	77.98
Sugar cookies with soy flour	8.37	19.54	72.09
Pastry without soy flour	8.06	33.60	58.34
Pastry with soy flour	9.88	34.30	55.82

TABLE 3

*Composition of rat rations**

PROTEIN SOURCE	TOTAL WEIGHT OF BAKED PRODUCT	CERELOSE	FAT	WESSON (21) SALTS	NUTRIENTS FURNISHED BY BAKED PRODUCT		
					Protein	Carbohydrate	Fat
	gm.	*gm.*	*gm.*	*gm.*	*gm.*	*gm.*	*gm.*
White cake without soy flour	960	—	—	40	60	732	168
White cake with soy flour	857	84	18	40	60	647	150
Yellow cake without soy flour	960	—	—	40	65	715	180
Yellow cake with soy flour	897	59	4	40	65	656	176
Devil's food cake without soy flour	960	—	—	40	65	719	176
Devil's food cake with soy flour	788	134	38	40	65	585	138
Sugar cookies without soy flour	960	—	—	40	64	749	147
Sugar cookies with soy flour	765	197	—	40	64	552	149
Pastry without soy flour	960	—	—	40	77	560	323
Pastry with soy flour	779	125	56	40	77	435	267

* Vitamins were added to all rations in the following amounts per kilogram: 20 mg. pantothenic acid, 10 mg. niacin, 5 mg. riboflavin, 4 mg. thiamine hydrochloride, 5 mg. pyridoxine hydrochloride, 200 mg. inositol, 200 mg. ascorbic acid, 200 mg. para-aminobenzoic acid, 500 mg. choline, 15 mg. 2-methyl-naphtho-quinone, and 125 mg. a-tocopherol. Vitamins were supplied by Hoffman-LaRoche, Inc. Two drops of halibut liver oil were given orally once a week.

There were two control rations, with the following compositions: (a) casein,† 60 gm., Cerelose, 732 gm., fat, 168 gm., and Wesson salts, 40 gm.; (b) powdered whole egg, 120 gm., Cerelose, 672 gm., fat, 168 gm., and Wesson salts, 40 gm.

† 1 gm. cystine per kilogram of ration.

Newell and Elvehjem (16) reported no inhibition of growth of rats fed chocolate milk, and Mitchell and Smith (17) noted no adverse effects of cocoa on the utilization of dietary calcium by adult human subjects. The effects of cocoa are being further investigated in this laboratory.

The soy flour improved the value of the protein of the cookies and pastry, but growth was poor in all groups. The proportion of soy flour to wheat flour in these rations compares favorably with that in rations fed by Jones and Divine (2) in which they found a protein efficiency of 2.16. However, their rations contained 9.1 per cent protein compared to 6.4 in the cookie rations and 7.7 in the pastry rations. The lower percentage of protein in the latter rations may have limited some amino acid or acids present in marginal amounts to such an extent as to seriously inhibit growth.

Another possible explanation of the difference is the destruction of heat-labile amino acids, notably lysine. Both cookies and pastry were baked in thin layers at rather high temperatures, conditions favorable to destruction of heat-labile products. Destruction of lysine by high temperature has been reported by Greaves *et al.* (18), Morgan (19), Block *et al.* (20), and Waisman and Elvehjem (21).

Human Nitrogen Balance Studies

The results of nitrogen balance studies on adult human subjects are presented in Table 6 and Figure 2. In three of the five subjects, a small improvement was shown in the nitrogen balance on the soy cake diet over that on the plain cake.

One individual record is worthy of comment. Subject *L. C.*, a young woman twenty-four years of age, showed a slight positive nitrogen balance at all times, on an intake of 25.89 gm. protein per day or 0.4 gm. per kilogram body weight or 2.24 gm. nitrogen per square meter surface area. This represents an intake somewhat below the 2.9 gm. nitrogen per square meter surface area reported by Hegsted (6) as required to maintain nitrogen equilibrium on an all-vegetable source of protein. The diet used in this

TABLE 4

Composition of diets of human subjects*

FOOD	PRELIMINARY DIET	DIET WITH PLAIN CAKE	DIET WITH SOY CAKE
	gm.	*gm.*	*gm.*
Cake	—	345	302
Rice (weight before cooking)	20	20	20
Canned applesauce	270	270	270
Canned peaches	—	140	140
Canned grapefruit juice	120	120	120
Lettuce	50	50	50
Canned tomatoes	130	70	70
Canned pears	120	—	120
Carrots	120	—	—
Butter	100	60	80
White sugar	110	10	25
Brown sugar	100	—	—
Corn sirup	20	—	—

* Daily supplements were given as follows: 600 mg. calcium as calcium lactate, 2 mg. thiamine hydrochloride, 3 mg. riboflavin, and 20 mg. niacin. Vitamins were kindly supplied by Hoffman-LaRoche, Inc.

TABLE 5

*Summary of results of rat growth studies**

PROTEIN SOURCE†	DIETARY PROTEIN LEVEL	PROTEIN CONSUMED	WEIGHT GAIN	PROTEIN EFFICIENCY‡	BODY NITROGEN GAIN	NITROGEN STORAGE EFFICIENCY §
	%	*gm.*	*gm.*		*gm.*	
Casein	6.0	12.3	27.6	2.24	0.71	0.37
Powdered whole egg	6.0	21.8	110.3	5.05	2.92	0.87
White cake without soy flour	6.0	12.6	30.3	2.40	0.75	0.37
White cake with soy flour	6.0	14.7	39.6	2.69	0.92	0.39
Yellow cake without soy flour	6.5	14.4	33.7	2.35	0.68	0.30
Yellow cake with soy flour	6.5	15.1	41.1	2.60	0.94	0.39
Devil's food cake without soy flour	6.5	11.4	14.5	1.27	0.28	0.15
Devil's food cake with soy flour	6.5	13.5	20.5	1.54	0.45	0.21
Sugar cookies without soy flour	6.4	9.9	1.8	0.18	0.03	0.02
Sugar cookies with soy flour	6.4	10.0	7.5	0.74	0.08	0.05
Pastry without soy flour	7.7	9.9	0.8	—	0.01	—
Pastry with soy flour	7.7	10.5	7.6	0.72	0.08	0.05

* Data are expressed as average per rat for a period of seven weeks.

† Differences between mixtures with and without soy flour were highly significant at the 1 per cent level for all five mixtures. The 1 per cent least significant difference between mixtures with and without soy flour was 5.2 gm.

‡ The term "protein efficiency" refers to the grams gain in weight per gram protein eaten.

§ The term "nitrogen storage efficiency" is used to designate the grams gain in body nitrogen per gram nitrogen consumed.

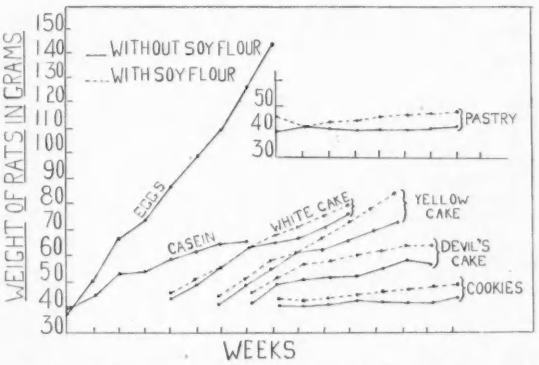


FIG. 1. *Effect on rat growth of the inclusion of a small amount of soy flour in certain baked products.*

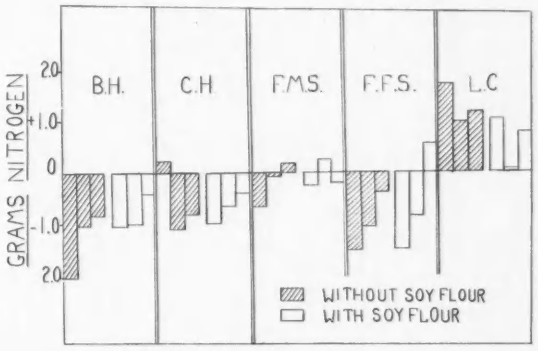


FIG. 2. *Nitrogen balance of human subjects showing average per day for three-day periods.*

study contained only the small amount of animal protein furnished by the milk and eggs in the cakes. Based on a study of 124 young women eating self-selected diets, McKay *et al.* (22) predicted that a mean intake of 56.0 gm. protein or 8.9 gm. of nitrogen per day was necessary for nitrogen equilibrium. Cederquist (23) predicted the mean intake of protein required for equilibrium to be 45 gm. per day, based on balance studies on six subjects on a mixed diet.

It appears that the improvement in value of the proteins of the soy-containing products, demonstrated with growing rats, is not great enough to be observed readily in *adult human subjects* by means of nitrogen balance studies. Species differences and differences in growth and maintenance requirements presumably contribute to these results.

SUMMARY

The effect of the inclusion of a small proportion of soy flour on the value of the proteins of certain baked products has been studied, both by the rat growth method and by means of nitrogen balance studies using human subjects. Soy flour was added to the mixtures to the extent of 6 per cent of the wheat flour in white and yellow cakes and 10 per cent of the wheat flour in devil's cake, pastry, and cookies, using formulas provided by commercial bakers.

In rat growth studies in which the baked products constituted the sole source of protein, the rats fed the products containing soy flour showed greater average growth in every case than those on the same mixture with an equivalent percentage of protein

but without soy flour. Protein efficiency and body nitrogen storage were also higher in every case in which the soy-containing mixture was fed.

The results of nitrogen balance studies on human subjects who received 80 per cent of their protein from the yellow cakes were inconclusive.

We believe that although the improvement in the value of the proteins of these baked products brought about by the addition of soy flour is not of great magnitude, these results are suggestive of a practical method of enriching the nutritive value of a wide range of products.

TABLE 6

Summary of data on nitrogen balance studies on human subjects

PROTEIN SOURCE	NITROGEN INTAKE*			NITROGEN ELIMINATED*			NITROGEN BALANCE*
	Basal	Cake	Total	Urinary	Fecal	Total	
			Subject B. H.				
	gm.	*gm.*	*gm.*	*gm.*	*gm.*	*gm.*	*gm.*
Plain cake	0.74	2.89	3.63	4.81	0.80	5.61	−1.98
	0.66	2.89	3.55	3.80	0.73	4.53	−0.98
	0.77	2.89	3.66	3.53	0.89	4.42	−0.76
Soy cake	0.56	2.83	3.38	3.38	1.00	4.38	−1.00
	0.57	2.83	3.40	3.22	1.16	4.39	−0.99
	0.74	2.83	3.56	3.22	0.73	3.96	−0.40
			Subject C. H.				
Plain cake	0.74	2.64	3.39	2.43	0.72	3.15	0.24
	0.66	2.63	3.31	3.60	0.74	4.34	−1.03
	0.77	2.64	3.41	3.37	0.79	4.16	−0.74
Soy cake	0.56	2.59	3.15	3.07	1.03	4.10	−0.95
	0.57	2.59	3.17	2.93	0.85	3.78	−0.61
	0.74	2.59	3.33	2.73	0.97	3.69	−0.36
			Subject F. M. S.				
Plain cake	0.86	3.44	4.29	3.75	0.95	4.70	−0.40
	0.67	3.44	4.11	3.35	0.82	4.18	−0.07
	0.89	3.44	4.33	3.11	1.04	4.15	0.18
Soy cake	0.71	3.34	4.06	3.13	1.14	4.27	−0.22
	0.68	3.34	4.02	3.03	0.73	3.76	0.26
	0.88	3.34	4.22	3.47	0.95	4.43	−0.20
			Subject F. F. S.				
Plain cake	0.74	2.89	3.63	3.90	1.16	5.07	−1.44
	0.66	2.89	3.55	3.59	1.05	4.64	−1.09
	0.77	2.89	3.66	3.24	0.74	3.98	−0.38
Soy cake	0.56	2.83	3.38	3.95	0.90	4.85	−1.47
	0.57	2.83	3.40	3.23	0.99	4.22	−0.82
	0.74	2.83	3.56	2.74	0.30	3.04	0.52
			Subject L. C.				
Plain cake	0.86	3.44	4.29	2.21	0.21	2.42	1.87
	0.67	3.44	4.11	2.48	0.68	3.16	0.95
	0.89	3.44	4.33	2.90	0.23	3.13	1.20
Soy cake	0.71	3.34	4.06	2.77	0.21	2.98	1.07
	0.68	3.34	4.02	3.34	0.64	3.98	0.04
	0.88	3.34	4.22	2.06	1.42	3.48	0.74

* Data represent average per day for three, three-day periods under each regimen.

REFERENCES

(1) Horvath, A. A.: The nutritional value of soybeans. Am. J. Digest. Dis. 5: 177, 1938.

(2) Jones, D. B., and Divine, J. P.: The protein nutritional value of soybean, peanut, and cottonseed flours and their value as supplements to wheat flour. J. Nutrition 28: 41, 1944.

(3) Carlson, S. C., Hafner, F. H., and Haywood, J. W.: Effect of soy flour and nonfat dry milk solids in white bread on the nutritional quality of the protein as measured by three biological methods. Cereal Chem. 23: 305, 1946.

(4) Scales, F. M., and Harrison, A. P.: Boric acid modification of the Kjeldahl method for crop and soil analysis. Indust. & Engin. Chem. 12: 350, 1920.

(5) Association of Official Agricultural Chemists: Official and Tentative Methods of Analysis. 6th ed. Washington: Association of Official Agricultural Chemists, 1945.

(6) Stearns, G.: A rapid method for the preparation of fecal digests suitable for use in nitrogen and mineral analyses. J. Lab. & Clin. Med. 14: 954, 1929.

(7) Hegsted, D. M., Tsongas, A. G., Abbott, D. B., and Stare, F. J.: Protein requirements of adults. J. Lab. & Clin. Med. 31: 261, 1946.

(8) Cannon, P. R., Steffee, C. H., Frazier, L. J., Rowley, D. A., and Stepto, R. C.: The influence of time of ingestion of essential amino acids upon utilization in tissue synthesis. Federation Proc. 6: 390, 1947.

(9) Leverton, R. M., and Gram, M. R.: Nitrogen excretion of women related to the distribution of animal protein in daily meals. J. Nutrition 39: 57, 1949.

(10) Sumner, E. E.: The biological value of milk and egg protein in young and mature rats. J. Nutrition 16: 129, 1938.

(11) Willman, W., Swanson, P. P., Stewart, G. F., Stevenson, G. T., and Brush, M.: Biological efficiency of egg proteins. Federation Proc. 4: 164, 1945.

(12) Bricker, M. L., and Mitchell, H. H.: The protein requirements of the adult rat in terms of the protein contained in egg, milk and soy flour. J. Nutrition 34: 491, 1947.

(13) Mitchell, H. H., and Hamilton, T. S.: The effect of different grades of cocoa upon the retention of dietary calcium by growing rats. J. Nutrition 31: 377, 1946.

(14) Mueller, W. S., and Cooney, M. R.: The effect of cocoa upon the utilization of the calcium and phosphorus of milk. J. Dairy Sci. 26: 951, 1943.

(15) Lipman, L. D., and Mueller, W. S.: The effect of cocoa upon the digestibility of milk proteins. J. Dairy Sci. 24: 399, 1941.

(16) Newell, G. W., and Elvehjem, C. A.: Studies on the growth of rats raised on chocolate milk. Science 99: 411, 1944.

(17) Mitchell, H. H., and Smith, J. M.: The effect of cocoa on the utilization of dietary calcium. J.A.M.A. 129: 871, 1945.

(18) Greaves, E. O., Morgan, A. F., and Loveen, M. K.: The effect of amino-acid supplements and of variations in temperature and duration of heating upon the biological value of heated casein. J. Nutrition 16: 115, 1938.

(19) Morgan, A. F.: The effect of heat upon the biological value of cereal protein and casein after 55 days. J. Biol. Chem. 90: 771, 1931.

(20) Block, R. J., Cannon, P. R., Wissler, R. W., Steffee, C. H., Jr., Straube, R. L., Frazier, L. E., and Woolridge, R. L.: The effects of baking and toasting on the nutritional value of protein. Arch. Biochem. 10: 295, 1946.

(21) Waisman, H. A., and Elvehjem, C. A.: The effect of autoclaving on the nutritive value of edestin. J. Nutrition 16: 103, 1938.

(22) McKay, H., Patton, M. B., Ohlson, M. A., Pittman, M. S., Leverton, R. M., Marsh, A. G., Stearns, G., and Cox, G.: Calcium, phosphorus and nitrogen metabolism of young college women. J. Nutrition 24: 367, 1942.

(23) Cederquist, D. C., Brewer, W. D., Radar, N. J., Ohlson, M. A., and Benne, E. J.: Nitrogen metabolism in college women. Federation Proc. 6: 404, 1947.

Go Whither You Will

During your free time at the A. D. A. Convention

Trips in and around Washington are tailored to the time you have available and to your pocketbook. You may travel by land or air or both. Furthermore, the planned trips are scheduled for the three days prior to the convention and the two days after it.

A unique arrangement has been conceived by one sight-seeing company, which will restore cash to the till of the state association. For each person registering for an excursion identified as Tour 6, approximately a dollar will be refunded to the state association's treasury. Tour 6 is a full day's excursion of Washington, Arlington, Alexandria, and Mount Vernon. It is personally conducted and costs $8.05, including lunch. This trip may be taken on Saturday, Sunday, and Monday, October 14, 15, 16, 21 and 22.

If your fancy draws you to a sky view of Washington, Arlington, and Mount Vernon, you may take advantage of a 30-min. flight arranged for October 3, 15, 21, and 22. The flights are contingent upon the number registering for them (fifty to a flight) and the weather. The cost is $2.88, including tax, with limousine service from any hotel at 90 cents per person. Reservations may be made at the Hospitality Booth at the Statler Hotel from 9 to 11 on the mornings of the flights.

A post convention sky cruise to historic Williamsburg, with ample time to ramble through the beautiful colonial setting, may be arranged. The rate of $25 covers the trip by air, the fee of the guide, and lunch. Your sole responsibility lies in registering.

The September issue of the *Journal* will carry more detailed information on the trips mentioned and the many places of interest in Washington.

Effect of Cocoa on Protein Utilization[1]

MAY S. REYNOLDS and RUTH ANN BEYER

Home Economics Department, University of Wisconsin, Madison

IN THE investigation of the value of soy flour as a supplement to white flour in various baked products (1), attention was called to the fact that none of the rats fed devil's food cake, grew as well as those fed the yellow cake of approximately the same composition. Both groups of rats fed the devil's food cake showed a lower "protein efficiency" and a lower "nitrogen storage efficiency" than those on any of the other cake rations. The literature on the effects of cocoa has been reviewed in the previous report.

The present study was undertaken to clarify that observation by feeding rations differing only in the cocoa and adjusted to the same chemical composition, and by equalizing food consumption by means of the paired feeding technique.

EXPERIMENTAL PROCEDURE

The devil's food cake was prepared according to the formula previously published (1) for the soy flour cake, while the "plain" cake was the same with the cocoa omitted. The rations were made equivalent in composition as previously described. Twenty-six male rats of the Sprague-Dawley strain, three to four weeks old and weighing from 40 to 50 gm., were paired according to weight. Six pairs were used for metabolism studies. Urine was collected with toluene, slightly acidified, for a preservative. Feces were collected in acid alcohol. The other seven pairs were used for growth studies only. The food intake of the rats on the plain cake ration was limited to the amount eaten by the rat of each pair on the devil's food cake ration. Protein efficiency and nitrogen storage efficiency were determined as previously described. The animals were maintained on the experiment for a period of six weeks.

RESULTS

The growth of the two groups of rats is shown in Figure 1. The increased gain in weight of the rats of the pair fed the plain cake ration, over those fed the devil's food cake ration ranged from 3 to 19 gm., with an average of 10 gm. for the thirteen pairs. The average protein efficiency for the thirteen rats fed plain cake was 2.39 with a range of 1.92 to 2.86, while that for the rats on the devil's food cake ration was 1.68, ranging from 1.33 to 2.09. The group on white cake ration stored an average of 7.4 gm. protein in six weeks, or 20.3 per cent of the weight gain while those on the devil's food cake ration stored 5.3 gm. protein or 17.9 per cent.

The nitrogen elimination on the devil's food cake ration exceeded that on the plain cake ration in both urine and feces. The greater difference shown in the fecal nitrogen indicated interference with protein digestion and absorption. The nitrogen intake and its disposition are shown in Figure 2.

DISCUSSION

The results of this study verify our earlier findings in every respect. Our results are in agreement with those of Lipman and Meuller (2) who found that cocoa interfered with the digestibility of milk proteins. Newell and Elvehjem (3) reported no adverse effects of chocolate milk on the growth of young rats. However, in their experiment, the chocolate com-

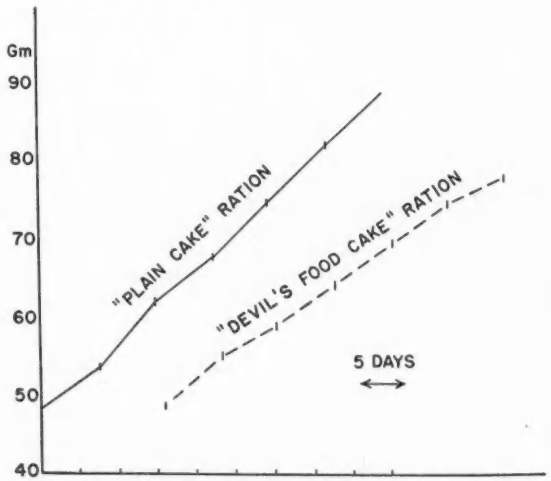


FIG. 1. *Average growth curves of rats on plain and devil's food cake rations.*

[1] This work was supported in part by a grant from the Soy Flour Association. Published with the approval of the Director of the Wisconsin Agricultural Experiment Station. Received for publication April 29, 1950.

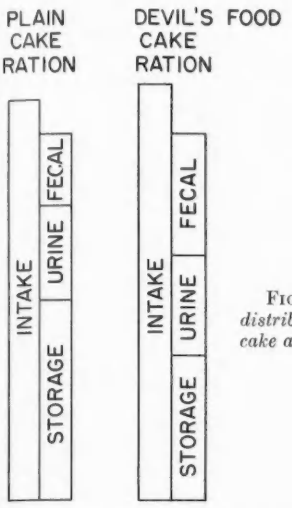


FIG. 2. *Nitrogen intake and distribution in rats on plain cake and devil's food cake ration.*

prised only about 1 per cent of the total ration, while in our experiment cocoa made up approximately 4 per cent of the dry weight of the ration. This difference in amount of chocolate or cocoa may easily account for the difference in the results of the two experiments.

In a recent report on the effect of cocoa in the diet of young women, Bricker *et al.* (4) have pointed out that cocoa increased the fecal nitrogen. However, they noted a decrease in urinary nitrogen, whereas in our growing rats, urinary nitrogen was also increased in the group fed the cocoa ration.

In considering the application of these findings to practical dietetics, it should be pointed out that it would be unusual for cocoa or chocolate to be included in the diet to the extent of 4 per cent. In any situation in which for any reason the supply or utilization of protein is borderline, however, it would appear to be wise to avoid large amounts of chocolate.

SUMMARY

The effect of approximately 4 per cent cocoa, as devil's food cake, in the ration of a growing rat, was studied in thirteen pairs of young males. Nitrogen balances were determined on six pairs. Growth studies only were made on the remaining seven pairs. In all pairs, the rat on the cocoa ration grew less well than the one on the plain cake ration. The protein efficiency and nitrogen storage efficiency were lower in all rats fed the devil's food cake.

REFERENCES

(1) REYNOLDS, M. S., AND HALL, C.: Effect of adding soy flour to the protein value of baked products. J. Am. Dietet. A. 26: 584, 1950.

(2) LIPMAN, L. D., AND MUELLER, W. S.: The effect of cocoa upon the digestibility of milk proteins. J. Dairy Sci. 24: 399, 1941.

(3) NEWELL, G. W., AND ELVEHJEM, C. A.: Studies on the growth of rats raised on chocolate milk. Science 99: 411, 1944.

(4) BRICKER, M. L., SMITH, J. M., HAMILTON, T. S., AND MITCHELL, H. H.: The effect of cocoa upon calcium utilization and requirements, nitrogen retention, and fecal composition of women. J. Nutrition 39: 445, 1949.

Milk Quality and Regulations to be Studied

The National Research Council is undertaking a study of the effect of health and sanitary regulations on milk quality. The work will be financed through a contract with the U. S. Department of Agriculture under the Research and Marketing Act.

Market milk and its products must conform to various statutes, ordinances, and regulations adopted and administered by local, state, and federal authorities for the purpose of protecting public health. Such regulations are applicable to production, processing, and distribution and are designed to insure the maintenance of various safety, nutritional, and esthetic properties of milk and its product. They may differ widely in requirements and differ also with respect to administrative interpretation and enforcement practices.

The purpose of the present study is to determine precisely what requirements are being enforced in representative jurisdictions and how the requirements affect the quality of milk delivered to the consumer. In this study the term "milk" is considered to include market milk and such milk products as cream and skim milk for fluid use and for use in the manufacture of ice cream.

It is planned, initially, to study municipalities with populations between 100,000 and 500,000 and the states within which these cities are situated. Statutes, ordinances, and regulations will be compiled in order to determine the range of variation of actual requirements in force and to select typical jurisdictions for intensive field study, including associated administrative and enforcement procedure. The effect of regulations upon quality will be investigated through laboratory and other research methods.

The study will be conducted under the supervision of a joint committee of the Food and Nutrition Board and the Agricultural Board of the National Research Council. Arthur C. Dahlberg, Ph.D., Professor of Dairy Industry, Cornell University, has been engaged as the director of the study.

Observations on Protein Improvements of Low-Extraction Wheat Flour

Supplementation with Soya or Cereal Germ in an Italian Nutrition Program[1]

RUTH FLUMERFELT BALLIETTE[2], PASQUALE deCAPRIO, and ELMER L. SEVRINGHAUS[3]

THE program and activities of the Italian Medical Nutrition Mission have been described elsewhere (1). An impression of the nature of the nutrition problem in Italy in 1945 was gained from observations based upon clinical material available in the Clinica Pediatrica of the University of Naples. Many of the children seen in the clinic came for nonnutritional complaints, although a portion were sent by relief agencies. The food intake of these children naturally varied a good deal, and the planning of a feeding program which would permit comparative studies necessitated an appraisal of the existing diet of each child. Dietary histories were obtained from the mothers with the aid of a bilingual interpreter[4]. Then a typical day's menu was formulated and calculated for each child. Apparent deficiencies detected in this way became the basis for a prescribed diet. Since this is only an approximate method, it is worth recording that the results from a series of 175 infants and children indicated an average daily protein intake of 2.5 gm. per kilogram of normal weight for stature. The optimum protein intake for this age is usually considered 4 gm. per kilogram. By omitting the nursing children and infants, the average fell below 2.0 gm. The caloric intake was estimated as about 40 per cent below the optimum.

An attempt was made to compare the effectiveness of three types of supplementation, based on (a) individual need, (b) equal amounts of animal and vegetable protein, and (c) one-third animal plus two-thirds vegetable protein. The total supplement in each case was approximately 1250 calories. The unpredictable epidemics of infectious diseases and the irregularities of clothing and fuel supply during the winter months introduced so many variables into the data from these groups that the weight gains of the three groups and of untreated controls furnished no data showing significant trends.

WEIGHT GAINS WITH PROTEIN SUPPLEMENTS

Another approach was made by taking dietary histories which included information on pre-war and wartime food habits on approximately 200 adolescent boys and girls. The daily dietary intake of the teen-age group is reported in Table 1. Clinically this group showed retardation in both growth and development, pallor, fatigue, and specific vitamin deficiencies. If the recommended allowance for protein for this age group averages about 85 gm. daily and the caloric allowances range from 2400 to 3200 calories, the in-

TABLE 1

Daily dietary intake of teen-age group

INTAKE	AMOUNT
Total protein	40.64 gm.
From animal sources	6.81 gm.
(Ratio of animal protein	16.75 %)
Fat	19.92 gm.
Carbohydrate	235.67 gm.
Total calories	1284.52
Ratio of protein intake to normal weight	0.89 gm./kg.

[1] Fundamental work described here was carried out during 1945 and 1946 in Italy by a team of fourteen people who went abroad under the auspices of the United Nations Relief and Rehabilitation Administration and the Unitarian and Congregational Service Committees.

[2] Present address, Wisconsin General Hospital, Madison.

[3] Present address, Hoffmann-LaRoche, Inc., Nutley, New Jersey. It is a pleasure for the authors to record their gratitude to Dr. Helen Mitchell, who arranged for a period of direct experience for one of us in the homes of some recently immigrated Italian families in New Haven, Connecticut, in advance of the field trip, in order that the techniques of Italian cookery and food selection could become familiar. Dr. Mitchell's helpful advice about Italian national dietary practices was extremely useful during the activities of the Italian Mission.

[4] Gordana Nikolich.

take of these adolescents was but 50 per cent of these recommendations.

A feeding program was designed to test the adequacy of vegetable proteins in supporting growth and development. Accordingly, four types of dietary supplementation were used designed to: (a) bring the intake up to the recommended allowances for both protein and calories by means of vegetable proteins alone; (b) bring the intake up similarly with mixed animal and vegetable proteins, (c) give a high-protein diet (130 to 150 gm. per day) by means of vegetable proteins alone, and (d) give a high-protein diet (130 to 150 gm. per day) by means of mixed animal and vegetable proteins.

In order to study average weight gains, ten human subjects were chosen at random from each of the four groups. In Table 2 are shown the composition of the daily supplement and its protein and caloric value, as well as average gain (in grams) per ten-day period of the ten subjects selected.

It is evident from Table 1 that a high-protein diet, which includes animal protein, is most effective in producing gain in weight. Most of the patients receiving Diet *2* were afflicted with active tuberculosis and this may account for the smaller weight gain in comparison with that observed in patients receiving Diet *1*. Here again discussion of the data without correlation with physical findings is inadequate.

VITAMIN STUDIES, TEEN-AGE SUBJECTS

In order to carry out vitamin studies on institutionalized teen-age children, the Italian Medical Nutrition Mission surveyed Buon Pastore, an orphanage for teen-age girls. This institution had been receiving Allied Military Government and U.N.R.R.A. assistance. The staple daily foods were skim milk powder, bread, minestrone, fruit, and oil. Meat, eggs, and cheese had not been served since the war began. Fish provided by U.N.R.R.A. was served once a week during June, July, and August, 1945. In Table 3 is given an analysis of the diet as compared with the 1948 Recommended Dietary Allowances of the Food and Nutrition Board (2).

It is evident from Table 3 that the only dietary intakes which even approached the allowances were thiamine and riboflavin. No allowance for cooking losses was made. Dietary supplementation was not furnished at Instituto del Buon Pastore much as it was needed, because of mechanical difficulties such as transportation, supplies, and personnel required for supervision.

TABLE 2

Weight gains on diets with protein supplements

COMPOSITION OF DAILY SUPPLEMENT	PROTEIN	CALORIES	AVERAGE GAIN
	gm.		*gm./10 days*
Diet *1*	46.5	705	130
Dried peas and beans—200 gm.			
Diet *2*	47.0	634	100
Skim milk powder—100 gm.			
Enriched bread—100 gm.			
Diet *3*	72.9	1334	100
Dried peas and beans—200 gm.			
Enriched bread—100 gm.			
Enriched pasta—100 gm.			
Diet *4*	108.5	1693	180
Dried peas and beans—200 gm.			
Skim milk powder—100 gm.			
Enriched bread—100 gm.			
Enriched pasta—100 gm.			

INFANTS AND CHILDREN

Pausilipon Hospital, a convalescent hospital for infants and children, was selected by the Nutrition Mission for special vitamin studies under controlled conditions. This hospital had been receiving U.N.R.R.A. assistance since April, 1945, which, however, did not materially affect the dietary intake since the same foods were formerly obtained through local charity.

A dietary history and analysis was of general interest. These histories revealed that skim milk powder, bread, pasta, rice, oil, and fruit were used daily. Meat, dried peas, dried beans, vegetables, and marmalade were served to the children three or four times per week. This diet was given only to the older children. Food for the nursing infants was cooked and prepared separately and consisted of skim milk powder, bread, rice, and pasta. Three to four times a week meat was offered to babies six months and older. In Table 4 is shown an analysis of the diets of the two groups as compared with the most recent dietary allowances recommended by the National Research Council.

The outstanding dietary deficiencies (Table 4) were fat, calcium, vitamin A, and ascorbic acid. These figures are higher than the actual daily intake since they were calculated without consideration for

TABLE 3

Comparison of nutritive intake of adolescent orphanage girls with Recommended Dietary Allowances (2)

NUTRIENT	INTAKE OF ORPHANAGE GIRLS	RECOMMENDED ALLOWANCE (2)
Calories	1395.20	2400–2600
Total protein (gm.)	47.10	75–80
Fat (gm.)	15.50	
Carbohydrate (gm.)	265.90	
Calcium (gm.)	0.84	1.0–1.3
Iron (mg.)	9.86	15
Vitamin A (I.U.)	209.20	5000
Thiamine (mg.)	1.16	1.2–1.3
Riboflavin (mg.)	1.68	1.8–2.0
Niacin (mg.)	7.37	12–13
Ascorbic acid (mg.)	10.30	80

TABLE 4

Comparison of nutritive intake of hospitalized infants and children with Recommended Dietary Allowances (2)

NUTRIENT	NURSING INFANTS		CHILDREN UP TO 12 YEARS OLD	
	Intake	Recommended Allowance (2)	Intake	Recommended Allowance (2)
Calories	1134.50	110/kg.	1928.00	1200–2500
Total protein (gm.)	45.00	3.5/kg.	61.00	40– 70
Fat (gm.)	10.50		25.80	
Carbohydrate (gm.)	240.00		363.00	
Calcium (mg.)	0.49	1.0	0.65	1.0– 1.2
Iron (mg.)	6.70	6.0	13.80	7.0–12.0
Vitamin A (I.U.)	30.00	1500	352.00	2000–4500
Thiamine (mg.)	0.52	0.4	1.13	0.6– 1.2
Riboflavin (mg.)	0.93	0.6	1.82	0.9– 1.8
Niacin (mg.)	6.34	4.0	10.33	6.0–12.0
Ascorbic acid (mg.)	23.00	30.0	9.20	35.0–75.0

cooking losses of water-soluble and heat-labile nutrients. The staple foods were usually boiled 2 to 3 hr. in an open kettle on a charcoal stove, and exact calculation of such cooking losses is difficult.

The only dietary change made was the substitution of whole milk for skim milk powder for the nursing infants. Fluid intakes of all children were recorded for one week, and the results showed about 300 cc. daily for the infants and 500 cc. daily for the older children. Forcing fluids in one ward brought excellent results.

ACCEPTABILITY OF PROTEIN SUPPLEMENTATION

Since it was known in advance that the probability of providing optimal amounts of such animal proteins as meat, eggs, or milk was low, the addition of vegetable supplements to the 70 per cent extraction wheat flour provided by U. N. R. R. A. was studied. These supplements were flour of approximately the same fineness, made from soya, both low-fat and full-fat, from wheat germ, from corn germ, and from sunflower seed[5]. These materials were incorporated, using 10 per cent of the supplement with 90 per cent of the unenriched wheat flour, and the mixtures blended by the Barbato Brothers' mill in Naples. A small portion of each type was made into small-sized pasta, which was distributed in the dry form for domestic cooking. The larger portion was baked by an Italian baker, Frederico Tortoro, whose recipe was known to include only flour, water, salt, and yeast.

[5] The supplies of soya flour were provided by the Staley Company, Decatur, Illinois. Wheat and corn germ as well as sunflower seed were provided in flours by Viobin Corporation, Monticello, Illinois. We are grateful for this generous assistance.

The bread was distributed in the clinic to appropriate families and individuals. Since it proved impossible to obtain data about weight gains, nitrogen balance, or other details which would afford a basis for judgment of the relative advantages of these types of bread, the information compiled has to do with the acceptability of these products to the Italian civilians. Introduction of revised forms of bread has always encountered resistance. It should be mentioned that the bread which had been available throughout the war and under ration control in Italy was a heavy, often slightly soggy, dark gray bread of over 90 per cent extraction. It was not always made from wheat alone, but the grain components were not generally known.

The pasta prepared from these supplementary vegetable proteins proved satisfactory in appearance, cooking, flavor, and keeping qualities. There was no difficulty with spoilage, even though the pasta was kept in a basement storeroom for six to eight weeks. The soybean pastas had a slightly yellowish tint which gave a mellow appearance similar to that of egg noodles. The wheat-germ pasta was white like the pre-war white flour pastas so highly prized. Corn germ made a dark, brownish tinted pasta similar to the one being sold on the Italian market. Sunflower seed pasta was also dark and had a slightly greenish color. Random questioning showed that the Italian women considered all our pastas to be "good pasta."

There was a more pronounced difference between the breads made from the various supplements. Low-fat soy bread was light, with a fine texture and a very crisp crust. It kept well without molding for twelve to fourteen days after baking. As it became older, it was harder and drier. The high-fat soy bread was similar in appearance to the low-fat soy bread except that it was slightly richer in flavor, the crust was not quite so crisp, and it kept eight to ten days without spoiling. The wheat-germ bread had less volume, was more compact in texture, and had a fine nutty flavor. The crust was not so crisp as that of the soy breads, and the bread kept 8 to 10 days without spoiling. The corn-germ bread was small in volume, elastic in crust, grainy in texture, with a pronounced grain flavor, and could be kept five to six days. As it became older it became more moist and most closely resembled the dark bread on the Italian market but was superior in quality. Sunflower seed bread was light like the soybean bread, had good volume and texture, a crisp crust, and a slightly green-gold color. In flavor it was similar to wheat-germ bread except for a slightly bitter after-taste which was noticed by the most discerning, but generally speaking it was popular both with the staff and with the patients.

In October, 1945, a ten-day survey was conducted on the acceptability of our bread and pastas. At that time sunflower-seed bread and pasta had not

been introduced. The patients were told that their answers to our question would in no way affect the amount or kind of food we gave them. The type of supplement the patient discussed was determined solely by description and our records of the dates the various types were issued to each person. Forty-four families were consulted and the results of the questionnaire are given below.:

(a) Number of people who could tell no difference between the four types of bread—22.
(b) Number of people who could tell no difference between the four types of pasta—27.
(c) Number of people who gave preference to low-fat soy bread—9; high-fat soy bread—7; wheat-germ bread—5; corn-germ bread—0.
(d) Number of persons who gave preference to low-fat soy pasta—4; high-fat soy pasta—4; wheat-germ pasta—12; corn-germ pasta—1. Six people thought wheat-germ pasta took longer to cook.
(e) Number of people who gave preference for our bread over the dark bread then on the Italian market—37.
(f) Number of people who gave preference for our bread over the pre-war Italian white bread —9.
(g) Number of people who preferred Italian pre-war white bread to our bread—19.
(h) Number of people who preferred Italian dark pasta to ours—2.
(i) Number of people who preferred our pastas to the Italian dark pasta then being sold on the market—37.

From this questionnaire it was evident that the soybean, wheat-germ, and corn-germ bread and pastas in Italy were acceptable and in general superior to the pasta and bread being sold on the Italian market.

Continued use of these supplements throughout the year of our study gave abundant confirmation to the conclusion that such supplemented breads and pasta could be introduced into Italian diets without resistance. Based on these data other units of U.N.R.R.A., under the direction of Sue Sadow (attached to the Rome Office), began introduction of soya supplements into bread and pasta without difficulty. Although the wheat-germ pasta may be favored, the acceptability of soya cannot be questioned. Soya flour is cheaper and keeps better than wheat germ which is prone to infestation. It appears, therefore, that soya is the most practical supplement for low-extraction wheat flour. The full-fat soya had as its disadvantage a slight suggestion of translucence in the bread. It should be emphasized that this experience was entirely with 10 per cent soya, a level widely recognized as representing a significant supplementation for wheat. The value of the soya oil in commerce and the major importance of the soya protein as a supplement for the proteins in low-extraction wheat flour led us to stress the value of low-fat soya.

SUMMARY

Observations made on the dietary data of infants and children in Naples in 1945 indicated deficiencies or protein, calories, vitamin A, ascorbic acid, and sometimes calcium.

Special attention was directed toward increasing the protein content of bread and pasta by incorporating a high-protein flour into the 70 per cent white flour provided by U.N.R.R.A. Four different flours were studied: soybean, wheat-germ, corn-germ, and sunflower-seed. It was found that flour which contained 10 per cent of either wheat-germ supplement or the low-fat soya produced bread and pasta acceptable to Italian adults and children.

The combined advantages of protein quality and economy made the further use of soya supplementation of wheat products appear worth while.

REFERENCES

(1) KYHOS, E. D., VAGLIO, N., AND SEVRINGHAUS, E. L.: Effects of malnutrition upon mothers and infants in Naples—1945. Am. J. Digest. Dis. 16: 436, 1949.
(2) FOOD AND NUTRITION BOARD: Recommended Dietary Allowances, Revised. National Research Reprint and Circ. Series No. 129, 1948.

Wardrobe Guide for Convention

Pin-point accuracy in a weather prediction for October is a mite more than can be attained at this time. However, the gentleman of the U. S. Weather Bureau who devotes himself to weather averages has cooperated generously in providing helpful data.

The average temperature for the October afternoon is 67 degrees, and the minimum for the early morning is 47 degrees.

Generally, rain falls on eight days of the month, about one day of every three. Those of you who wish to determine in advance the prospects of rain during the convention period may proceed along these infallible lines: 8 is to 30 as X is to October 17–20. Whatever the result, the weather man asserts firmly that October in Washington is about the sunniest month of the year.

Trends in Family Food Consumption[1]

HAZEL K. STIEBELING, Ph.D.

Chief, Bureau of Human Nutrition and Home Economics, U. S. Department of Agriculture, Washington, D. C.

THE mid-point of our century seems an appropriate time to look at our dietary position—examining the past and considering the future. Over the last forty years our national food supply has provided between 1500 and 1600 lb. a person a year, except during the recent war when it was somewhat higher, rising to a peak of about 1700 lb. in 1946. That year we had food enough to provide about 3400 calories a person a day, but in the immediate prewar years, 1935-39, and again in 1949, we used less—about 3200 calories.

In simple terms of pounds or calories per person, the trend since 1909 is not very exciting. But, are there any changes of concern to the nutritionist? I think there are—a number that are favorable; some that call for thought.

TRENDS IN THE NATIONAL FOOD SUPPLY

Early in the century we were getting well over 40 per cent of our food energy from such staple foods as bread, flour, cereals, peas, beans, and potatoes. We received somewhat less than 30 per cent from each of two other broad groups—fats and sugars taken together, and milk, meat, eggs, fruit, and the succulent vegetables combined. Today, grains, pulses, and potatoes provide only about 30 per cent of our calories, and the other two groups about 35 per cent each.

Although these three broad groups are now about equally prominent in our diets, as far as calories go, they differ markedly in their contributions in other dietary essentials.

In addition to calories, the grains, beans and peas, and potatoes—foods relatively cheap to produce and market—supply significant amounts of protein and certain minerals and vitamins. The fats and sugars provide, along with 35 per cent of our calories, some vitamin A from butter and fortified margarine, and some important fatty acids, but little else, in terms of essential nutrients. Milk, meat, eggs, fruit, and succulent vegetables are foods that are relatively costly because they require much land and labor to produce and need special care during marketing. Nevertheless, they provide, in addition to calories, generous amounts of high-quality protein, minerals such as calcium and iron, and many kinds of vitamins. Rich in many nutrients, they help to make up for shortages of certain nutrients in other classes of food.

A precept to use fats and sugars in moderation probably should have high priority in nutrition education. It is easy to overeat of these flavorful foods, and health can be endangered by too many as well as by too few calories. Too many calories lead to surplus weight, which in turn is associated with shorter life expectancy and increased incidence of diabetes, hypertension, and other forms of cardiovascular disease. Most types of cancer also seem to be more prevalent among the overweight than underweight, and a high-fat diet seems to be favorable to the growth of many types of experimental tumors.

MINERALS AND VITAMINS

Since 1909 there have been long-term increases in the quantity of calcium, iron, and five of the vitamins provided by our national food supply.

Increases in calcium and riboflavin are due largely to our increased use of milk over the years. Iron, thiamine, and niacin rose markedly during the first half of the 1940's with the enrichment of bread and flour and a rise in the consumption of meat. Vitamin A (carotene) and ascorbic acid also show a long-term upward trend, due to the increasing consumption of leafy green and yellow vegetables and of tomatoes and citrus fruit.

Our 1949 food supply, if shared in accordance with need and used with discrimination, could give everyone in this country a diet that would meet the Recommended Dietary Allowances of the National Research Council. It is providing somewhat fewer calories (8 per cent) than that of forty years ago and a little less protein (9 per cent), but more fat (13 per cent). It also is providing substantially more calcium (21 per cent) and riboflavin (24 per cent), and somewhat more thiamine (13 per cent), iron (11 per cent), niacin (8 per cent), and ascorbic acid (11 per cent).

The forecast for 1950 is that food consumption will equal or possibly exceed 1949, since plentiful

[1] Presented at the Dietetic Section of the meeting of the American Association for the Advancement of Science in New York City on December 27, 1949.

supplies and slightly lower retail prices are anticipated. Greater consumption is expected of butter, lard, eggs, meat, green and yellow vegetables, and tomatoes. But for the fifth consecutive year there may be a decrease in the per capita consumption of fluid whole milk and cream.

FAMILY FOOD CONSUMPTION

How do families share in the national food supply? Needless to tell you, our food is not divided according to individual need. Some disparities arise from differences in purchasing power among families. Other disparities come from lack of knowledge as to what constitutes an adequate diet. Still others we may charge to a lack of conviction that something of value can be gained by bringing customary food habits into closer accord with present-day nutritional knowledge.

Nevertheless, a trend toward a more bountiful table among families with modest incomes has long been part of the general rise in standards of living. Thus, wage earning families were found to be spending more for food in 1934-36 than would have been required to duplicate the food purchases made seventeen years earlier in 1917-19. The same kinds and quantities of foods that families paid $521 for in 1917-18 could have been bought for $389 in 1934-36. But changed food habits led them to spend $508 for food—$119 more than it would have cost to follow their earlier food patterns. With the lower food prices of the mid-thirties, they could satisfy food needs and wants which had not been met before.

Many forces have been at work to bring about a better dietary situation through the years. Families have had higher real incomes. Food supplies have been relatively abundant. Advances in transportation, processing, and storage of foods have made many vegetables and fruits, once highly seasonal, increasingly available throughout the year, even in the smaller and more remote communities. New developments in technology have produced new kinds of foods and put old foods in new forms and packages. We have restored or enriched some foods with specific nutrients and have learned more about conserving the inherent nutritional values and palatability of others. Added to these is the fact that now we all know more about what constitutes a good diet.

RELATION OF INCOME TO FOOD EXPENDITURES

Recent studies show how various economic segments of the population fare with respect to food. Significant gains in the quality of the diet have been made by low-income families.

In 1948, the food expenditures of city families in the lowest economic third were about two and one-half times as high as in 1942. Prices were higher, but this group also used more of the relatively expensive foods in 1948 than in 1942. Quantities of meat, poultry, fish, and eggs increased nearly 30 per cent. Milk and its products other than butter, tomatoes, citrus fruit, and green and yellow vegetables follow, with increases of about 20 per cent; and other fruit and non-starchy vegetables, with increases of about 10 per cent.

In contrast, the highest economic third spent only 70 per cent more for food in 1948 than in 1942, on the average. The extra money went chiefly for more milk, some kinds of fruit and vegetables, and sugar. Unlike the lowest economic third, the highest income group showed no appreciable change over the six-year period in their average consumption of meat, poultry, fish, and eggs, or of the nutritionally-important tomatoes, citrus fruit, and green and yellow vegetables. But the two economic groups were similar in a lessened use of potatoes and a sustained use of fats and grain products.

Up to now we have discussed trends in food supplies for the whole population, and the changes in diets, particularly among low-income groups in cities, during a period of rising national income. Let us now look at the effect of income on the rate of change in consumption of major food groups among city families in the spring of 1948.

Certain types of foods were purchased in larger quantity by high-income families than by those in lower income brackets—chiefly fruits and non-starchy vegetables, milk and its products other than butter, and meat, poultry, fish, and eggs—whereas other foods, notably flour and cereals, were bought in lesser quantities.

Families with incomes of $7500 or more used about two-thirds more milk and meat than those with incomes under $2000—an average of 20 qt. fluid milk (or its equivalent in other forms) per week compared with 12, and an average of 14 lb. meat, poultry, and fish per week compared with 8½ lb. Families in the highest income bracket used over twice as much fresh fruit as those with incomes under $2000—18 lb. per week compared with 8½ lb. The purchase of frozen fruits and vegetables was influenced more by income than any other group of foods. Families with incomes of $7500 or more used almost ten times as much frozen fruits and vegetables as did those with incomes under $2000.

NUTRITIONAL ADEQUACY OF DIETS

How do long-term trends and income differentials in food consumption affect the nutritive value of family diets? So far as averages are concerned, diets of city families looked better in the spring of 1948 than in 1942, and better in 1942 than in 1936.

Calcium is one of the nutrients in which diets in this country tend to be below recommended allowances. But in the spring of 1948 almost three-fourths of the urban families had diets that met recommended calcium levels, compared with about half in the spring of 1942, and only about one-third in 1936.

As for ascorbic acid, 80 per cent of the city families had diets that met recommended levels in the spring of 1948 as compared with only 40 per cent twelve years earlier.

Also in the spring of 1948, 80 to 90 per cent of city families had diets that met recommended levels for three of the B-vitamins, vitamin A value, iron, and protein—a great improvement over the earlier nutritional scene.

THE LOOK AHEAD

What does the past suggest about food consumption in the future? The fact that families in the lower income groups fared better as the years passed suggests that our changing food habits are the result of many forces, including education, abundant food supplies, and increased purchasing power.

But a goal of 150 million good diets has still to be achieved. Our experience with recent years of relatively high real income shows that shifts of food consumption needed for nutritional improvement will not be accomplished by changes in income and price relationships alone. In the spring of 1948 there still were many families in the higher income classes whose diets furnished less than recommended allowances in several important nutrients. About 20 per cent of the city families with incomes of $5000 or more after taxes had diets estimated to fall below the allowance for calcium. The diets of about 20 per cent were below dietary allowances in thiamine, 15 per cent in riboflavin, and 10 per cent in ascorbic acid. At the lowest income levels, family diets were relatively short also in vitamin A, protein, and iron.

In correcting the situation, an increase in milk consumption would be very helpful, since milk is an excellent source of calcium, riboflavin, high-quality protein, and many other needed nutrients. Those who have been thinking of milk only in terms of the nutrients appearing in the usual tables of food composition may be astonished to learn the National Research Council has a report in press that includes a carefully documented list of more than one hundred nutritive substances in milk.

Even in 1948 when milk consumption was a little higher than it is now, almost 30 per cent of all city families were using less than 3½ qt. a person a week of milk or its equivalent in terms of cheese, evaporated milk, cream, and ice cream. About 60 per cent had less than the equivalent of 5 qt. a person a week. This is slightly below the average amount suggested in the low-cost food plan of the Bureau of Human Nutrition and Home Economics of the U.S. Department of Agriculture.

To raise diets low in thiamine and niacin would take additional meat, poultry, and fish, more pulses, and more whole grain or enriched grain products.

Higher dietary levels of ascorbic acid would call for more fruits and vegetables of all kinds, but especially more citrus fruit and tomatoes, for these are generally the most economical sources of this vitamin. Almost one-third of the urban families in the spring of 1948 were using less than 2 lb. per person a week of citrus fruit and tomatoes.

Many of the suggested shifts are in the direction toward which families would normally tend as purchasing power increases. But the trend needs to be accelerated by those who can afford it. Among low-income families, many are achieving a good diet by a different trend, that is, by using more of the cheaper highly nourishing foods. But here also we can see room for improvement, for many families could be better fed by learning to put more emphasis on these foods.

In educational programs designed to forward these necessary changes, there is of course no one best method. Teaching is best when it utilizes a variety of media and methods. We have in common only our goal and the basic nutrition principles leading to it. Each of us—whether teacher, doctor, nutritionist, dietitian, or home economist in social welfare or in business—may use a different means to make a contribution to the improvement of the nutrition in this country. But each of us has a contribution to make to the nutrition education of the public, and we must all strive to do it better.

Light on Iron Requirements

At a Symposium on Community Nutrition held March 22, 1950, at Washington University School of Medicine, St. Louis, Dr. Carl V. Moore, Professor of Medicine, reported on studies of iron excretion, using radioactively-tagged iron.

He explained that technical errors involved in the ordinary type of balance experiment are so great as to make results of doubtful significance. To obtain additional information on iron requirements, radioactive iron was used to study the daily loss of iron from the body. From these determinations, it has been estimated that from 0.25 to 0.5 mg. iron is excreted daily via the intestinal tract. About the same amount is found in perspiration. The daily excretion therefore, is between 0.5 and 1.0 mg. Menstrual blood loss in women accounts for approximately 1 mg. additional per day.

From these figures, a reasonably close approximation of nutritional requirements can be calculated. About 50 per cent of food iron is present in such a form that it can be absorbed. Of this "absorbable portion," 20 to 30 per cent is actually utilized. The amount of food iron required to replace the loss by excretion, therefore, is less than 10 mg. per day for the normal male but may vary from 10 to 20 mg. for the normal female.

Editorial

THE CHART OF SPEAKERS COMES TO LIFE

Advance Convention Program Notes

A few weeks ago, if you had glanced at the chart on which the names of the convention speakers were to be printed, you would have seen neatly ruled columns, each headed with the day and date, and below, square boxes, each carrying the hour of the session. That was all—just lines and clean patches of white.

There was no evidence yet that a cross section of the membership from coast to coast was weighing the merits of outstanding people, potential guest speakers, considering their achievements, evaluating their interest-value to you. There was no indication that for months the program committee had been operating industriously—that later it was tabulating the frequency of the suggestions of names and subjects as they were received.

Time came when a pen invaded a blank square. You would have read, "Dr. E. V. McCollum," and you would have remembered this illustrious biochemist of Johns Hopkins University, whose works on vitamins and minerals you have read. He is going to discuss "Some of the Earlier Speculations on the Significance of Phosphorus Compounds in Nutrition." The chart was coming to life.

A subject of keen interest was introduced to the chart when Dr. Winthrop N. Phelps accepted the invitation to speak on nutrition and feeding problems of children with cerebral palsy. A pioneer in the treatment of cerebral palsy, Dr. Phelps occupies a foremost position in the nationwide campaign to relieve sufferers of this disability.

Dr. Nina Ridenour, a psychologist of impressive attainments, who is the director of the Division of Education, National Committee for Mental Hygiene, Inc., has been asked to discuss some of the aspects of understanding human behavior.

The author of a book which has become classic, on the subject of psychosomatic medicine, is Dr. O. Spurgeon English who has agreed to present his ideas on "Psychosomatic Medicine and Dietetics" on Thursday morning.

On another day and at another hour appeared the names of Dr. Norman Jolliffe, who is indelibly identified with applied nutrition; and Dr. Leonard A. Scheele, Surgeon General of the U. S. Public Health Service in Washington, both of whom will talk about aspects of community nutrition.

Dr. Charles G. King, Scientific Director of the Nutrition Foundation, New York, was scheduled to speak on "Current Research in Nutrition."

Under the Food Administration session was penned the name of Ernest Crocker, widely known for his research and writing on taste and odor, with the title of his talk, "Flavor Speaks for Quality." In this general category appeared the name of Fern W. Gleiser, Professor of Institution Economics and management at the University of Chicago, who is slated to reveal the "Hidden Costs within the Dietary Department." Interest in management subjects led to the inclusion of Maye Hoover, Director of Government Cafeterias, in Washington; Ewan Clague, of the U. S. Department of Labor; and Ercole Rosa, Jr., of the School of Engineering of Columbia University, whose topic is "Equipment Design and Work Simplification—A Tool in Reducing Food Costs."

Extensive activity in the study of diabetes introduced on the chart the names of Doris Johnson, Chairman of the Committee on Diabetic Diet Calculation; and Marion E. Nichols and Dr. Hugh L. C. Wilkerson of the Diabetes Section, U. S. Public Health Service.

Popular acclaim brought Dr. Hazel K. Stiebeling into October 18's listing, with her topic "Food—An International Concern." You will remember that Dr. Stiebeling is the Chief of the Bureau of Human Nutrition and Home Economics of the U. S. Department of Agriculture.

The school lunch program, with a variety of related subjects, inspired invitations to such authorities as Dr. E. Neige Todhunter, University of Alabama; Dr. Millicent L. Hathaway, of the U. S. Department of Agriculture; and Frances Welch, Director of School Lunchrooms, Dallas.

Frequent expressions of interest in the subject of geriatrics prompted the scheduling of Vera W. Walker, Consultant on Standards of Assistance, Florida State Welfare Board.

The growing use of plastic ware induced the presentation of Charles N. Gardner of the Chemicals and Plastics Section, Research and Development Branch of the Military Planning Division.

An excellent choice to carry the responsibility of blending conviviality with calories is Jennings Randolph, Assistant to the President of Capital Airlines, the banquet speaker. A dynamic personality, good humor, and a measure of wit characterize the gentleman, who is rated as one of the most convincing public speakers in America.

Most of the squares of the chart are filled now, a symmetrical pattern in black and white—but to you who know what the names represent in scientific and technical achievement, it means a rare and exciting opportunity to gather the riches of the mind.

Current Comment

IS DYNAMIC KNOWLEDGE OF NUTRITION ESSENTIAL FOR *EVERY* DIETITIAN?[1]

GERTRUDE E. MILLER

Instructor in Dietetics, Veterans Administration Center, Los Angeles

In psychiatry, the concept of role-playing, although not new, is used to describe the expectations which an individual has for himself and which society has for him at various ages and in stated circumstances. It means, for example, that if he should be a school teacher, he will behave within the circumscribed pattern his culture has tailored to fit school teachers. If he is a bank president he will expect and be expected to perform all the tasks and have the traditional attitudes of a bank president. Should Fate cast him in the role of a public hero, he will learn that over and above the performances that raised him to acclaim, still more is demanded of him. If he is to be a successful public hero, he will need to adjust to excessive inroads into his private life, to being photographed frequently; he will expect to be asked his opinion on a great many subjects and probably to die in obscurity; in short, to play the role of an American public idol.

The pattern of any role one might mention is probably determined over a period of time by urgency, expediency, blind circumstance, and sometimes tradition. It may enlarge or diminish for some of the same reasons.

Probably not many of us engaged in diverse tasks regard ourselves as actors, although Shakespeare said we were. We may prefer to think less theatrically. But whether we use the vocabulary of the playwright or that of the psychiatrist, we recognize that the concept of role-playing applies to us as to all other persons. We, too, have assumed obligations defined for us by usage and a brief tradition, although we may never have taken the time to analyze carefully just what this means.

[1] Presented at the Institute on Dietetic Service in Veterans Administration Hospitals, held March 28–April 8, 1949, at Los Angeles. Reviewed in the Veterans Administration and published with the approval of the Chief Medical Director. The statements and conclusions published by the author are the result of her own study and do not necessarily reflect the opinion or policy of the Veterans Administration.

WHO IS A DIETITIAN?

References to role-playing may seem to be irrelevant in introducing this paper. Nevertheless the concept is fundamental to an underlying inquiry which you have already anticipated. The discussion has paved the way for asking: "Who is a dietitian?" At this point in our development this question may well be asked. The Constitution of the American Dietetic Association does not define her as an individual, but under Article II, says: "The object of this Association shall be to improve the nutritional status of human beings; to raise the standards in dietetic service; to protect the status of the profession; and to foster cooperation between the members and workers in allied fields."

This is a broad statement which in part, at least, gives us a clue as to who the American Dietetic Association says a dietitian is. In the stated goals for the members of the Association there seems to be an emphasis on nutrition, professional relationships, and high standards.

The U. S. Employment Service has described a dietitian as follows (1): "Dietitians use their knowledge of chemistry and nutritional value of food and the food needs of healthy and sick people in planning meals which will provide a balanced diet, and in buying and supervising the preparation of food for large groups of people and individuals in hospitals, schools, hotels, clubs, or factories." This is a more specific definition which seems to describe rather well what the average layman believes us to be.

Here are two concepts of "dietitian," one as expressed by our executive body and one as understood by the layman. They are in both instances expressions of the universals which presumably all dietitians have to some degree in common. That is to say, the definitions presume that dietitians have a common background, common knowledge, and some of the same attitudes.

It might be well to be more discerning. Our backgrounds in the main are similar, but our knowledge in this period of expansion may have grown to be quite dissimilar despite the presumptive definitions just quoted. The following observation will illustrate the point indirectly and reflect a rather pronounced trend.

THE TREND TOWARD SEGMENTATION

When the program chairman for the local dietetic association is obliged to plan a year's meetings, she

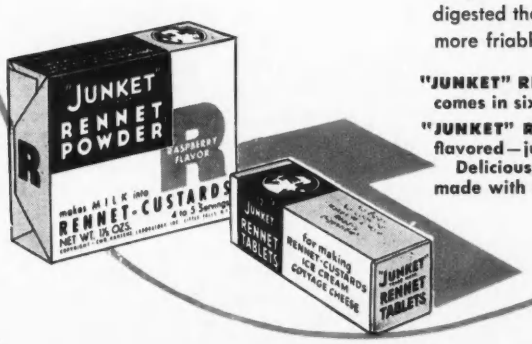
GIVING MILK THE GREEN LIGHT!

WHEN MILK IS A VITAL PART of the daily regimen, such as in infancy, childhood, pregnancy, and for gastro-intestinal, postoperative and geriatric conditions—a serious aggravation of the dietary problem may occur for those patients who (either for physiologic or psychologic reasons) are unable to ingest this essential nutrient.

In such cases, the *red light* of milk refusal may be quickly changed to the *green light* of eager acceptance—by transforming the liquid milk into deliciously flavored, tasty rennet desserts, through the medium of rennet powder or household rennet tablets.

Young and old alike relish these temptingly smooth custard-like desserts which incorporate the uncooked milk — with all nutritional factors unchanged — into a variety of delicious, colorful rennet desserts. They're so simple to prepare—and are more easily digested than milk itself, because of the softer, more friable curds formed in the stomach.

"JUNKET" is the trade-mark of Chr. Hansen's Laboratory, Inc., for its rennet and other food products, and is registered in the United States and Canada.



"JUNKET" RENNET POWDER — already sweetened — comes in six popular flavors;

"JUNKET" RENNET TABLETS are not sweetened or flavored—just add sugar and flavor to taste.

Delicious, highly acceptable rennet desserts may be made with either.

"JUNKET" BRAND FOODS
DIVISION
Chr. Hansen's Laboratory, Inc.
LITTLE FALLS, N. Y.
L-850

usually thinks in terms of "this many programs for the therapeutic group, one or two about child feeding, and the rest to attract the administrative dietitians." If we go to a series of ten or more meetings, we note that the attendance is just about in the proportions the program chairman anticipated. The dietitians who are administrators will like to hear discussions on subjects about which they already know a great deal, and the diet therapists will occupy the seats when such topics as "Protein Metabolism and Its Significance in the Light of Recent Findings" are being presented. The lines are not sharply drawn, but they are there. Should this situation be the subject of comment, the usual remark is "Well, natural interest, you know."

The trend toward segmentation which is the order of our day has been interesting to watch. Even within our own profession we think of ourselves as administrative, ward, cafeteria, clinic, therapeutic, research, or teaching dietitians. But we recognize, too, that although our role may be changing, the departure from its original concept is not yet complete. We are specialized, but we are not totally specialized. There are still hundreds of dietitians in small hospitals who almost daily use everything they learned in training—they purchase, keep records, manage personnel, write diets, teach diets, plan menus, make sanitary inspections—they do everything. They unquestionably fit into the definitions we have just reviewed, and the information required by them encompasses every known area of dietetics.

However, in specializing, some knowledge and skills are tending to disappear from the armamentarium of certain dietitians. This seems to be necessary because the accumulation of new information within a specialty is rapid and because these persons must have late and expert knowledge. Perhaps it is pertinent to ask whether, in the process of growth, we have changed so much that we no longer are what we are presumed to be; or whether we—all of us—still have major skills and knowledge in common. Time and our executive body will probably provide the answers in full to these questions, but for now I'm sure it is proper to say we still have much in common. The principles of personnel management, sanitation, training, menu planning, interviewing, to name only a few, have wide application. And a knowledge of normal nutrition is an essential without which a dietitian cannot do an adequate job as we presently define her role.

NUTRITIONAL KNOWLEDGE—THE DIETITIANS' UNIVERSAL

It would be profitable to explore each of these skills and to point out once more how they relate to each of the specialties, but space limits our discussion to only one. Let us, therefore, discuss the common need for a sound knowledge of nutrition, since it is probably the *one* "universal" which binds us together. Upon it we place our claim to professional status. There are food service managers, there are skillful buyers, there are personnel experts, there are sanitarians, but their positions do not demand basic nutritional knowledge for professional standing. Indeed, it is our expert knowledge of nutrition, inseparable from both preventive and therapeutic medicine, which gives us as dietitians the distinctive status, "one of the medical team." It is singled out for discussion here, too, because there are indications that basic knowledge in this area is sometimes less than adequate to meet both recognized and unrecognized challenges. We shall deal with our nutritional knowledge particularly in relation to the administrative dietitians since their role, superficially at least, appears to be less related to it now.

Probably at this point we should make a distinction between an academic and a practical knowledge of nutrition. Academic knowledge belongs to the specialists. It is concerned with making fine distinctions, sorting out evidence, and translating it into workable terms. At this point it becomes practical, applicable nutrition. It is important to make this distinction, else we may find ourselves debating an undebatable point.

ADMINISTRATIVE DIETITIANS' NEED FOR NUTRITIONAL KNOWLEDGE

Obviously the clinic, ward, therapeutic, research, and teaching dietitians need a sound knowledge of nutrition. They should not attempt to function without it. But the basic importance of this knowledge to the administrative specialists may now be open to question. To answer it, let us consider together some of the situations in which the administrative dietitian finds herself. *And*, in all that we say, we shall keep the patient in mind, for regardless of what dietetic position we may hold, we lose our perspective, indeed our reason for being, if we don't do this.

Menu Planning

To begin then, the administrative dietitian is often the menu planner. If not, she at least is the final authority on what is to be served. In menu planning she is influenced by many factors. Looming large among these is a consideration of cost. A set of standards has been established to serve as a guide for her to follow so that she will know that her expenditures are within reason at the same time she is serving an adequate diet. You know these standards. To follow them doesn't require any particular knowledge. A food service manager could do it. It is a pat form. But, suppose the dietitian finds one of the food groups unpopular? What is the choice? Serve less than the recommended amount (this would certainly help the budget) or, continue to serve these foods while at the same time initiating an educational program? The latter course would indicate she had some strong convictions about nutrition.

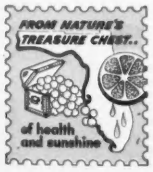
here's health...

YEAR-'ROUND!

(with less labor... more efficiency)

The rich nutritiousness of Florida's famed orange juice now can become part of the year-'round *daily* dietary—through the use of Florida Frozen Concentrated Orange Juice. Processed from choice fresh Florida oranges, the Frozen Concentrate is as flavorful as fresh juice at its best, and comes to the consumer with the same high abundance of vitamin C and other nutrients,* including natural fruit sugars —so essential to sound bodily development and the release of quick energy. It is easily stored and quickly prepared.** Thus the sparkling goodness of refreshing, delectable orange juice (supplemented by other citrus fruits and juices, fresh and canned) can now grace the family table every day of the year —benefiting young and old alike.

FLORIDA CITRUS COMMISSION
LAKELAND, FLORIDA



*Among the richest known sources of vitamin C are the citrus fruits. They also contain vitamins A, B_1 and P, and readily assimilable natural fruit sugars, together with other factors such as iron, calcium, citrates and citric acid.

**Adding three parts of water to a 6-oz. can of Frozen Concentrated Orange Juice makes a pint and a half of single strength orange juice.

FLORIDA

Oranges • Grapefruit • Tangerines

The choice a dietitian makes at this point should mark her departure from the role of food service manager.

A survey of hospital dietaries with respect to their adequacy was recently reported (2). After directing attention to various special diets which are recognized in our diet manuals as being inadequate, the reviewer makes these significant statements: "Perhaps less excusable from the standpoint of dietary planning is the quality of the 'full house diet' or regular diet which serves as the fare of all patients not under usual restrictions. It would be reasonable to expect that this type of diet would meet the goals . . . as set up in the recommended allowances of the Food and Nutrition Board. The samples analyzed in the present study . . . fell short of this expected level in their content of ascorbic acid, thiamine, riboflavin, and niacin. A perusal of the menus provided in the report convinces one that the full house diet could have been altered by better menu planning so that it met these standards."

Should such an analysis be done at random over the country, I should not be surprised to read of other similar reports. As a matter of fact, I recall one dietitian who, after analyzing the dietary pattern followed for years in her institution under her predecessor, asked her board for several thousand dollars more to make the diet adequate. In view of the fact the funds had to come through the Community Chest, you may be sure she spoke to her board with real conviction, and that she realized fully her responsibility to the institution.

Here is a situation in which the dietitian must put into practice her knowledge of normal nutrition, although apparently there are those who either do not have a sound knowledge of nutrition or are not convinced that the Recommended Dietary Allowances are important enough to consider.

Therapeutic Responsibility of the Administrative Dietitian

Isn't it unfortunate that we cannot detect early subclinical states of nutrition easily; that we do not fully realize yet what damage these states produce in the metabolic systems; and what the long range effects can be? Thousands of patients are admitted to the hospitals every day in states of subclinical deficiency. It is true we seldom see full blown deficiency disease, yet, once in a while we do. An individual comes in with pneumonia and suddenly develops a case of pellagra or begins to show marked signs of riboflavin or thiamine deficiency. Why? Because the extra metabolic demands of the disease have transformed a subclinical state into a full blown deficiency. We are reminded repeatedly that infections, surgical wounds, and deranged metabolism place heavy demands on nutrition and that the state of a patient's nutrition largely conditions his speed of recovery.

In aviation there is a phrase—"the point of no return." When the big planes take on fuel for the long ocean hops I am told the pilots have a figure in miles, past which if they go, there is not enough fuel to bring them back so they must continue.

Research seems to suggest that in nutrition, there also may be a point of no return, a point past which if one goes, damage is irreparable. This is true in animal nutrition in relation to the developing embryo. Co Tui speaks of "critical levels" in protein nutrition as being specific for each type of tissue injury. Newer concepts of pernicious anemia seem to suggest that we may be dealing with a damaged metabolic system—a system which once had the power to make a vitamin, or a series of them, but which has lost that power so that the individual must live as a parasite in order to survive. If all these facts are true, then there would be such a thing as a "point of no return." Who is to say when or where or how it occurs? In the face of unknowns, if one must err, it would seem better to err in the direction of safety, in the direction of the National Research Council's Recommended Dietary Allowances.

I can think of no more potent reason for a dietitian having a sound knowledge of nutrition than I have just indicated. She must assume therapeutic responsibility no matter what her work is, because she is one of the medical team.

Business Contacts

Another situation which confronts the administrative dietitian and demands that she be informed is her contact with the food industry and business world. Because the salesmen with whom she has interviews are all well trained and often highly educated, she must be able to evaluate the information which they give concerning their products from the standpoint of currently sound nutrition knowledge. She often determines which product shall be purchased.

Inter-Departmental Relationships

The administrative dietitian is the person most directly concerned with inter-departmental relationships. She represents her department at staff and board meetings. She is the person first contacted when any problem involving dietary service arises. These problems are not always administrative; often they involve nutrition. Particularly is this true when medical consultations occur. Without laboring the point, I think we could say it would not be unreasonable to expect that each department head should have good basic information about his own field. We expect it of the medical administrator, of the social worker, of the physical therapist. I imagine they expect as much of us. This point related to the administrative importance of nutrition should not be overlooked.

Menu Magic

SALADS THAT SING

● **Patrons will sing** your praises—when you make your salads *sing* by using a dressing that gives real, creamy-rich, home-tasting flavor and goodness!

● **Carefully made** from famous Heinz vinegars and other choice ingredients, Heinz 57 Salad Dressing points up the flavor of your salads to perfection. Easy to serve, it is economical and saves the time of your help. Why not talk to your Heinz Man about the details and costs.

PICKLES WITH ZING!

● **Perk up your menus** and the appetites of your customers by garnishing your dishes with zesty Heinz Pickles, Sweet and other Relishes. They go great with cold plates and sandwich specials!

● **Heinz Sweet Pickles,** Spiced Pickles, Fresh Cucumber Pickle, Sweet and other Relishes are packed in sealed No. 10 and gallon containers to retain their sparkling flavor and make them easier for you to serve. Your Heinz Man will show you that Heinz has *the* pickle for every purpose!

HEINZ Salad Dressing **HEINZ Pickles**

Maintaining Balance Within the Department

One of the problems in the administration of a large staff of specialists is the problem of maintaining unity and job satisfaction. Via the grapevine or otherwise we learn sometimes, particularly when the administrator is exceptionally gifted as a business woman, that the therapeutic, research, and clinic dietitians have grown to regard themselves as stepchildren. Within their own group they may talk about their work as being useless, since their administrator does not seem to care or even to know, for that matter, whether they are doing it well. Does this sound impossible and a little melodramatic? Is it news? It may be, but I have heard of it.

To say that each of us is gifted differently is trite. Emerson writes of those with practical perception, those with artistic perception (into which group fall the scientists by and large) and those with spiritual perception. He says that it is only "once in a long time a man traverses the whole scale." Michelangelo was such a person. This truth becomes naturally the basis of much misunderstanding. The practical man says of the other, "he's impractical." The artist says, "he sees only grossly." The man with spiritual perception moralizes all the time. So it goes.

But what does a knowledge of nutrition have to do with this? I would suggest that an administrator who maintains a vital interest in nutrition has an excellent tool for encouraging staff unity. Too often staff meetings are devoted almost entirely to administrative questions, of which there are a multitude, and they must be considered. But in planning meetings, the scope of work of the whole staff should be considered and pointedly recognized. Some of the conference time could be allotted to therapeutic problems] of interest, to current literature on nutrition, or even to an occasional review of normal nutrition, the principles of which are forgotten by even those who deal in it most.

Nutritional Knowledge as a Teaching Tool

The hospital dietitian has many responsibilities, too, in teaching nutrition. One of her most important duties relates to teaching dietetic internes. Our interns just out of college must be given assistance in applying the principles of nutrition. A review of normal nutrition is necessary before an understanding of therapeutic dietetics can be built on it, and we must also be ready to present new findings.

I know also of an instance in which a group of experienced dietitians, a large number of whom were therapeutic, were examined for their up-to-date knowledge of normal nutrition. The questions were not catch questions, and the group was not a freak sample. The results provided motivation for concentrated study of the newer knowledge of nutrition.

SUMMARY

When we assumed the role of hospital dietitian, we accepted the obligations belonging to it. As we analyze these obligations, we realize that even with the distortions of specialization, we continue to have much in common. Of the skills we hold in common, a knowledge of nutrition is the most important because upon it we base our claim to professional status as one of the medical team; because it is expected of us by professional and lay groups; because when we put the patient into correct focus in relation to our work, we must have it; because it is inseparable from daily contacts; and, because it can be part of a significant administrative technique. We have indicated that we must study constantly to be up-to-date.

Perhaps you do not agree that an administrative dietitian surrounded by a staff of experts, needs to concern herself more than superficially with nutrition. You may be right—if not now, eventually. But until her role shall have changed completely, the discerning administrator of the hospital dietetic service will always recognize that she functions most effectively when her knowledge is broad, and she will not wish to be walled in by her special interests.

REFERENCES

(1) National Roster of Scientific and Specialized Personnel: Medical Professions. U. S. Employment Service Description of Professions Series Pamphlet No. 4, 1947, p. 3.

(2) Nutritional inadequacy of hospital diets. Nutrition Rev. 7: 336, 1949.

Sale of Carbonated Beverages in Schools

In the May 5, 1950 issue of the *Journal of the American Medical Association*, the Council on Foods and Nutrition went on record as opposing the sale of carbonated beverages on school premises. In its statement, the Council says: "School children generally have a limited sum for the purchase of their lunch. If a portion of this money is spent on substances of limited nutritional value, the value of the lunch which a child may obtain with the remaining money obviously is reduced. The availability of carbonated beverages on school premises may induce a child to spend lunch money for these and allow him to develop poor dietary habits. This is especially true for the younger children. Expenditure for carbonated beverages yields a nutritional return much inferior to that from a similar sum spent for milk or other staple foodstuff. Furthermore, when given a choice between carbonated beverages and milk to accompany a meal, a child may frequently choose the less nutritious beverage. In view of these facts, the Council believes that carbonated beverages should not be sold on school premises."

HERE'S THE NEW WEAR-EVER ALUMINUM Double Boiler

with inside pan made of durable

ALCLAD* ALUMINUM

THIS new double boiler with its many kitchen features is any chef's pet. And it's calculated to bring reassuring smiles to the faces of men responsible for cutting replacement costs.

Big feature is its inside pan made of corrosion-resistant Alclad* Aluminum. Other features include:

1. *Ladle-fitting bottom on inside pan (stands by itself)*
2. *Open beads*
3. *Strong, durable construction (but light to handle)*
4. *Loop handles on both containers*
5. *Cool bakelite knob on cover*

This is the kind of item your customers will appreciate knowing about. So be sure to talk it up on all your calls.

AVAILABLE IN 3 SIZES

		East	Far West
No. 4359	*8 quart (outside container holds 9 quarts)*	$ 9.90	$10.95
No. 4360	*12 quart (outside container also holds 12 quarts)*	14.90	16.55
No. 4362	*20 quart (outside container also holds 20 quarts)*	19.50	21.65

USE THIS DOUBLE BOILER

FOR COOKING . . . cereals, puddings, cream soups, white sauces, newburg.
WITH ICE IN THE BOTTOM . . . for butter, fruit, puddings, etc.
IN THE BAKESHOP . . . for cream pie fillings, fruits, etc.

*** ALCLAD ALUMINUM**

consists of 2 outer surfaces of special alloy which impart unusual resistance to corrosive action, permanently bonded to a core of strong aluminum alloy.

For information write:

THE ALUMINUM COOKING UTENSIL COMPANY
1308 WEAR-EVER BUILDING
NEW KENSINGTON, PA.

Book Reviews

Michael Reese Hospital Diet Manual. Prepared by the Dietary Department in conjunction with the Dietetic Committee of the Medical Staff. Chicago: 1950. Paper. Pp. 43. Price $1.50.

The new Diet Manual from Michael Reese Hospital in Chicago is an outstanding example of the modern trend toward a simplified plan of diet therapy, but with emphasis on flexibility in terms of individual needs. Simplification has been made possible by defining and describing diets in terms of dietetic principles rather than disease or "special diets" prescribed and named after each physician. For some time, diet manuals have contained scientific data on meal planning in terms of nutrients, but it is new to find the increased emphasis on flexibility and adaptations which will enable the patient to change his food habits as easily as possible.

In the section on child feeding, the philosophy of liberal feeding is presented clearly and concisely, and as such, it will be particularly helpful in orienting new staff. Another instance of liberal feeding is in planning for the diabetic patient. Such desserts as cookies, cakes, puddings, and pies which have hitherto been forbidden are grouped and averaged in order that allowance may be made for them in the diet of the patient whose caloric allowance is sufficiently high. In view of the above principles, there is one seeming flaw—in terminology. For the patient with gastrointestinal disease, the diets are named "Modified Sippy Diet," "G. I. Diet #1," and "G. I. Diet #2." It must be admitted, however, that to name diets for gastrointestinal diseases is far from easy. Numerous committees of the Diet Therapy Section of the American Dietetic Association have attempted to come to some satisfactory terminology, but to date, no solution has been reached. There would also be some controversy in the suggestion on page 33 that calcium and riboflavin tablets be used as a substitute for milk for the pregnant woman. Also there will be some question regarding the advisability of serving an inadequate liquid diet as described on page 16 even for a short time. In both cases it was pointed out in the manual that neither practice was the best solution.—*Barbara Ruby, University of Chicago Clinics.*

Navy Recipe Service (NAVSANDA Publication 7). Navy Department, Bureau of Supplies and Accounts, Washington, D. C. First issue, July 1949. Second issue, February 1950.

This set of 5 by 8 in. recipe file cards, when completed, is intended to replace the *Navy Cook Book*. To date, two sets have been issued, some of the second issue (February 1950) replacing recipes in the first issue (July 1949). All recipes have been tested by industry and the Navy Supply Corps School in Bayonne, New Jersey.

Recipes on the cards are clearly printed in one hundred portion units with the size of each serving portion specified. Ingredients are given in both weights and measures, with the method of preparation well detailed in columns opposite the ingredients. An index and some miscellaneous information on formula conversion; range of temperature for ovens; temperature tests for stages of sugar cookery; equivalents for fresh, evaporated, and powdered milk; and equivalents for fresh, frozen, and powdered eggs are included with each set.

This recipe file could easily serve as the nucleus of good basic recipes for common food items in any large quantity cookery unit. However, it does not present the variety of recipes to which most hospitals are accustomed. Most conspicuously missing items are the recipes for meat extender dishes which budget allowances require in most hospitals. For the ground it covers, this recipe file would be very worth while. So for the Navy has no plans for distribution of the sets outside of the Armed Services.—*Ruth Dickie, Chief Dietitian, Wisconsin General Hospital, Madison.*

Sunset Cook Book of Favorite Recipes. Edited by Emily Chase. San Francisco: Lane Publishing Co., 1949. Cloth, spiral bound. Pp. 415. Price $2.75.

A happy hunting ground for gourmets is rapidly developing on the West Coast. Much evidence of "why" is to be found in this inclusive, delightful, original, and convenient cook book. Denver is apparently not far enough west for circulation of *Sunset* Magazine, from which the recipes were taken, but, with few exceptions, ingredients used are those obtainable anywhere. What makes it new are the ideas and combinations that are fresh.

Homemakers and dietitians, and those who are both, will enjoy leafing through this handy, spiral-bound book that lies flat at the desired recipe.

The West has been settled by peoples from many states and nations. This is shown here by recipes from Guatamala, Mexico, Italy, Spain, Holland, Australia, Norway, Denmark, Russia, Hungary, Hawaii, China, and Switzerland. Many foods, regionally popular in our own country, are included.

A quick survey of intriguing titles gives us: Trader Vic's Mayonnaise, Cheddar with Sherry, Omelet Ouangi, l'ambrosia, deerburgers, Hawaiian shrimp curry, horseradish applesauce, Oregon chess pie, and many others.

The more than twelve hundred recipes in easy-to-read form, carefully indexed, make this cook book a real buy. Good nutrition is achieved by generous use of the fine foods produced in western states.—*Virginia Monahan Bayles, University of Denver.*

The Texas Cookbook. By Arthur and Bobbie Coleman. New York: A. A. Wyn, Inc., 1949. Cloth. Pp. 256. Price $2.50.

This cook book is not only a collection of some two hundred fifty recipes, but is the story of Texas' fascinating history compiled by Arthur Coleman of the San Antonio *Express* and his wife, who is a language instructor at Brooke Army Medical Center. Particular emphasis is placed on the contribution and heritage of the Spanish and Mexican ancestors of Texas. The book is written in story form covering the various phases of meats, eggs, vegetables, soups, hors d'oeuvres, salads, breads, desserts, and beverages with tales and recipes for all.

Many unique and unusual recipes are added, such as the methods for frying or stewing rattlesnake meat and the making of crackling bread, tocas, enchiladas, and tortillas. Many old camp recipes are given, for instance, the one for sour dough biscuits with which is incorporated the story of how they were formerly made over the camp fire. However, other good, standard recipes are not omitted.

This book would interest anyone who enjoys good folklore and who likes to try the unusual in highly seasoned foods. The only difficulty one might encounter is the obtaining of some of the special seasonings common to Latin-American settlements.—*Betty Jean Ingram, Harris Hospital, Fort Worth, Texas.*

	Calories	Protein Gm.	Calcium Gm.	Copper mg.	Iron mg.	Phosphorus Gm.	Vitamin A I. U.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Ascorbic Acid mg.	Vitamin D I. U.
National Research Council Allowances, Sedentary Man (154 lbs.)	2,400	70	1.0	1.2	12	1.5	5,000	1.2	1.8	12	75	Small Amount
Ovaltine in Milk, 3 Servings *	676	32	1.12	0.5	12	0.94	3,000	1.16	2.0	6.8	30	417
Percentages of N. R. C. Allowances Provided by 3 Servings* of Ovaltine in Milk	28%	46%	112%	42%	100%	63%	60%	97%	111%	57%	40%	Abundance

*Each serving made of ½ oz. of Ovaltine and 8 fl. oz. of whole milk.

Supplementation

A sure step to dietary adequacy

The aim of the dietary at all times and under all conditions is to provide ample amounts—not just minimum amounts—of all nutrient essentials. Only when the daily nutrient intake is fully adequate, based on the most authoritative nutritional criteria, can the possibility of adequate nutrition be assured. It is for this reason that a food supplement assumes great importance in daily practice. It should be rich in those nutrients most likely deficient in prevailing diets or in restricted diets during illness and convalescence.

The *multiple nutrient dietary food supplement*, Ovaltine in milk, is especially suited for transforming even poor diets to full nutritional adequacy. This is clearly shown by the data in the table above.

Note in particular the high percentages of the dietary allowances for nutrients and the relatively low percentage of the total calories furnished by the servings of Ovaltine in milk. Thus, without unduly increasing the caloric intake, Ovaltine in milk greatly increases the contribution of nutrient essentials. Enticing flavor and easy digestibility are other important features of this dietary supplement.

Two kinds, Plain and Sweet Chocolate Flavored. Serving for serving, they are virtually identical in nutritional content.

Ovaltine

THE WANDER COMPANY, 360 N. MICHIGAN AVE., CHICAGO 1, ILL.

Current Literature

Contributed by Janette C. Carlsen and Ethel M. Miller, The Johns Hopkins Hospital, Baltimore; Hermia M. Handt, Veterans Administration Hospital, Hines Illinois; Berdena Rosenow, University of Kansas Medical Center, Kansas City, Kansas; Pauline Kegereis, The Children's Mercy Hospital, Kansas City, Missouri; Mildred Bonnell and administrative interns, University of Washington, Seattle; and the Journal staff.

THE AMERICAN JOURNAL OF NURSING

Vol. 5, March, 1950

* Radiotherapy and the nurse. N. Best.—p. 140.
Establishing good food habits. L. Weng.—p. 155.

Radiotherapy. Information is given here on the care of patients receiving radiation therapy. Symptoms of radiation sickness, nausea, anorexia, easy fatigability, and malaise are alleviated by liver extract, thiamine, viosterol, intravenous glucose, and saline. Forced fluids, especially citrus juices, and a high-carbohydrate, high-protein diet in small frequent feedings are desirable. Sour substances help counteract a metallic taste in the mouth.

BRITISH MEDICAL JOURNAL

No. 4462, May 13, 1950

A half-century's experience in diabetes mellitus. E. P. Joslin.—p. 1095.
* Food and mankind. J. Yudkin.—p. 1101.
* Intestinal obstruction due to food. N. Ward-McQuaid.—p. 1106.

No. 4663, May 20, 1950

* Diet in the treatment of acute hepatitis. O. Gertzen.—p. 1166.
Methionine in the treatment of acute hepatitis. J. Strom.—p. 1168.

Food and Mankind. Can the earth produce enough food for its inhabitants? Can the food be equitably distributed among the countries according to their population? Can the food be equitably distributed among the population of each country according to individual requirements? These problems and their possible solution are discussed. The opinion is offered that the present sytsem of food rationing in England has possibilities that would be applicable to the world, since this system has resulted in a better distribution of food to all income groups and the system has been responsible for the improvement in the health of the nation.

Intestinal Obstruction Due to Food. The great variety of foodstuffs reported to have caused acute intestinal obstruction are listed. Persimmons, peaches, oranges, mushrooms, bran, apples, figs, cherries, and grapes, in that order, accounted for more than one-half the obstructions. Dried fruits accounted for almost one-third of the cases reported in recent years. The majority of obstructing foodstuffs are those rich in fiber, desiccated fruits which swell as they take up water, or substances resistant to the digestive juices. The foods are often uncooked, and in the case of fruits are sometimes unripe. Mastication is often absent or inefficient, either because the patient is edentulous or because he has bolted his meal.

Diet and Acute Hepatitis. In three series of cases of acute epidemic hepatitis, extra amounts of protein, carbohydrate, and fat, respectively, were given combined with a balanced basic diet. The caloric content was maintained at about 3000. No statistical difference was found as to duration of treatment or the time taken for the blood and urine tests to become normal. It seems, then, that considerable freedom can be observed in the composition of the diet as an excessive increase of protein, carbohydrate, or fat has no apparent effect on the course of the illness.

GASTROENTEROLOGY

Vol. 14, April, 1950

* The cerebral cortex and gastric motility. B. P. Babkin.—p. 479.
* The influence of dispersion upon the absorption of vitamin A and fat as studied by fluorescence microscopy. B. W. Volk and H. Popper.—p. 549.

Cerebral Cortex and Gastric Motility. Various parts of the brain in dogs were removed systematically in order to study factors controlling gastric motility. Results led to the tentative conclusion that in abnormal emotional states the moderating effect of the cerebral cortex on vagal gastric centers is diminished, creating a favorable condition for hyperactivity of vagal centers. The result is abnormal secretory and motor function of the stomach.

Absorption of Vitamin A and Fat. Studies with fluorescence microscopy revealed that the absorption of vitamin A or fat in the rat intestine is more efficient if given in aqueous dispersions than in oily solutions. If excessive doses of vitamin A or relatively large amounts of fat are administered, temporary storage occurs in the lamina propria of the villi.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

Vol. 143, May 13, 1950

* Vitamin D. P. C. Jeans.—p. 177.

Vol. 143, May 20, 1950

* Fat-soluble vitamins A, E, and K. H. R. Butt.—p. 236.

Vol. 143, May 27, 1950

Fluid therapy. D. C. Darrow and E. L. Pratt—p. 365.

Vol. 143, June 3, 1950

Fluid therapy. D. C. Darrow and E. L. Pratt.—p. 432.

Vitamin D. Vitamin D—its forms and its importance—are reviewed. Requirements for children of various ages and for adults are given.

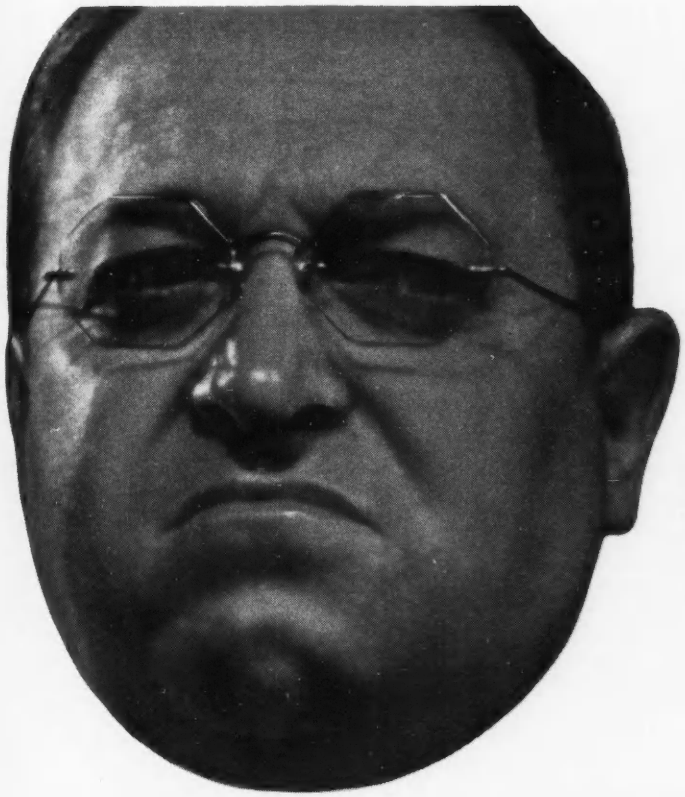
Fat-Soluble Vitamins. A discussion is presented of the fat-soluble vitamins. Human requirements are reviewed for each vitamin.

THE JOURNAL OF BIOLOGICAL CHEMISTRY

Vol. 184, May, 1950

* Some effects of restriction of dietary protein on the intracellular components of liver. E. Montwyler, S. Seifter, and D. M. Harkness.—p. 181.

Effect of Diet on Liver Components. This study was undertaken to determine the site of changes occurring in the liver cells of protein-depleted rats with respect to the



The Case of FUSSY FREDDY*

*AND A CLEVER DIETITIAN'S SOLUTION!

Fussy Freddy was as fussy as a patient could be. He fussed about not smoking, about visiting hours, and about being awakened before 9:00 a.m. But his clever dietitian made sure he would never find fault with his food. For example, when it came to cereal, she served him Post's *Individual* Cereals. Freddy was able to choose a different cereal seven days a week (and two on Sundays).

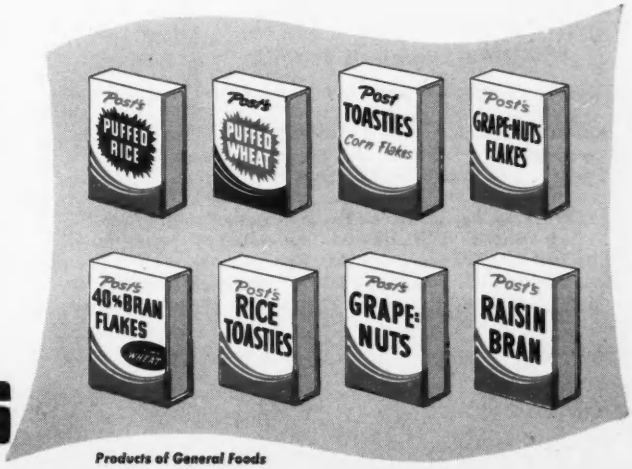
No Waste—Sanitary, Too!

Then, too, Post's 1-oz. individual-serving packages eliminated waste. Because, on those mornings when Freddy was too sick to eat his breakfast, she merely returned the unopened Post's package to the hospital storeroom. Sealed protective wrappings kept the cereal fresh, prevented any chance of contamination.

And the dietitian never had to take the risk of leaving *open* cereal in her kitchen.

P.S. Post's also gave Freddy's dietitian a bonus! For Post's Cereals are packed with valuable prize coupons she was able to redeem for her choice of more than 1,400 prizes for her hospital or personal use. Won't you send today for a free Catalog listing these prizes? Write: General Foods Institution Prize Dept., Box 121, Dayton, Ohio.

POST'S *Individual* **CEREALS**



Products of General Foods

concentration of nitrogen, total phosphorus, nucleic acids, and riboflavin. The results seem to indicate that, of the liver cell components studied, the microsomatic fraction was most affected by the restriction of dietary protein.

THE JOURNAL OF NUTRITION

Vol. 41, May, 1950

Effects of dietary composition on tooth decay in the albino rat. J. H. Shaw. —p. 13.

Nutritional value of plant materials. I. Growth of rats on purified rations containing soybean protein. M. O. Schultze.—p. 103.

* Calcium retained from one level of intake by six adolescent girls. F. A Johnston, D., Scheaphoff and T. McMillan.—p. 137.

Calcium Retained by Six Girls. Six girls, thirteen and fourteen years of age, were maintained for nine weeks on a controlled diet. The total period was divided into a one-week adjustment period and an eight-week experimental period. During the entire time the diet contained approximately 1 gm. calcium per day. The mean amount of calcium retained by each of the six subjects was 174, 239, 248, 279, 297, and 444 mg. per day, respectively. The mean retention was 281 mg., or 26 per cent of the intake. On the basis of the limited data available, an estimate of the amount of calcium which needs to be retained by girls of this age for the building of bone and other tissue was made. As judged by this estimate, each of the six subjects was retaining an adequate amount.

THE MILBANK MEMORIAL FUND QUARTERLY

Vol. 28, April, 1950

* Changes in world consumption of calories and proteins over the last decade. C. Chatfield, M. L. Scott, and J. Mayer.—p. 103.

The relation of protein scarcity and modification of blood protein to tuberculosis among undernourished subjects. J. Marche and H. Gounelle. —p. 114.

World Consumption of Calories and Proteins. In 1948, 35 per cent of the world's population received an intake of 2000 calories or less, as compared with 22 per cent in 1938. These figures were obtained by studying the data received by the United Nations from its member governments. Although this decade has been marked by a 1 to 2 per cent increase in the supply of calories and proteins, there has been an 8 per cent increase in population. The result has been a 6 to 7 per cent decrease in the per capita food supply. Regions with a low consumptive status have sunk even lower, while countries with a good food situation have maintained themselves or improved.

THE NEW ENGLAND JOURNAL OF MEDICINE

Vol. 242, May 4, 1950

* The clinical response of rheumatic fever and acute carditis with ACTH. B. F. Massell, J. E. Warren, G. P. Sturgis, B. Hall, and E. Craige.—p. 692.

Rheumatic Fever Response to ACTH. ACTH was administered for a period of ten days to fourteen weeks to ten patients with active rheumatic fever. ACTH therapy seems to have two opposing actions in patients with active rheumatic carditis and congestive failure. A tendency of the hormone to cause retention of fluid may result in aggravation of the latter condition. On the other hand, suppression of the active rheumatic process and consequent improvement in the myocardium tends to relieve the congestion. In cases in which ACTH caused an accumulation of fluid, congestive failure could be controlled by a low-sodium diet and mercurial diuretics.

COLLEGE AND UNIVERSITY BUSINESS

Vol. 8, May, 1950

Fraternity food centrally purchased. D. D. Lancaster.—p. 40.

* How a university cafeteria meets big city competition. W. F. Stevens. —p. 49.

Meeting Competition in a University Cafeteria. A university cafeteria in a large city may meet with considerable competition for customers. Emphasis is placed on cooperation with commercial restaurants and incorporation of suitable new ideas gained from visiting other restaurants. Probably most important is a constant program of personnel training with regular monthly meetings at which problems and suggestions are discussed.

FOOD INDUSTRIES

Vol. 22, May, 1950

* Paper chromatograms spot amino acids. R. J. Block.—p. 88.

Freezing time of your meat depends on what's in it. J. M. Ramsbottom, P. A. Goeser, and E. J. Strandine.—p. 95.

* When freezing apple slices, be sure of your variety. K. G. Knight and P C. Paul.—p. 100.

Paper Chromatography and Amino Acids. As a result of the development of present-day paper chromatography, all the usual amino acids in a food mixture can now be readily determined by the method of paper chromatography. With certain adaptations, the findings can be both qualitative and quantitative. The procedure is outlined.

Freezing Apple Slices. Tests were made to determine which varieties of apples were best suited for preservation by freezing. Pre-freezing treatments were also studied. Results indicated that Rhode Island Greenings rated highest and Jonathans rated second. It was found that apples must be mature at time of harvest to make a satisfactory frozen product. Results on the best methods for preventing browning are also given. They vary with types of apples.

FORECAST FOR HOME ECONOMISTS

Vol. 66, May, 1950

* The F.H.A. at work. T. E. Kauffman.—p. 16.

* Evaluation of appreciations. H. Fleck.—p. 29.

Home economics education at Oklahoma A. & M. College. R. M. Caldwell. —p. 34.

Future Homemakers of America. The organization and activities of the Future Homemakers of America are described in this article. The group is sponsored by the Home Economics Service of the U. S. Office of Education. Any public school student who has studied or is studying home economics is eligible for membership. The article should prove helpful to A.D.A. members who are interested in carrying on vocational guidance activities with the local chapters.

Evaluating Appreciations. The evaluation of appreciations is relatively more difficult than the evaluation of other aspects of human development and growth. Listed here are a number of indications of appreciation that can be observed by the teacher. Many of the suggestions can be applied to employee training.

HOSPITALS

Vol. 24, May, 1950

* A qualified dietitian saved the day, the budget and morale. N. Ammons. —p. 105.

The Dietitian—An Asset. This article, written by a hospital administrator, serves as an excellent piece of public rela-

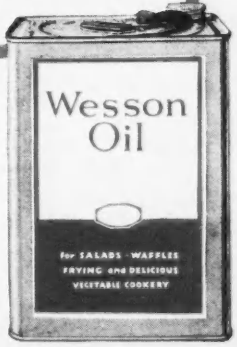
It Really Appeals When the Weather Sizzles

Now is the time when crisp, cool salads sharpen appetites. *Any time* is the time when Wesson Oil helps make your salads more tempting—and helps build prestige for you. Mild, delicate Wesson Oil never covers up your subtle seasoning. Wesson Oil brings out the full dressing bouquet, gives the dressing *your* individuality. American women buy more Wesson Oil than any other brand of salad oil.

— and for

CHIFFON CAKES

Experts use Wesson Oil to insure Delicate Flavor, True Chiffon Texture and Unique Keeping Quality



Wesson Oil

America's Favorite Salad Oil

for French Dressing and Mayonnaise . . . for Frying . . . for Waffles

WESSON OIL AND SNOWDRIFT SALES COMPANY

New York New Orleans Savannah San Francisco Houston Chicago

tions as far as the dietetic profession is concerned. The many ways in which the hospital food service and employee- and patient-morale were improved are pointed out.

HOTEL MANAGEMENT

Vol. 57, May, 1950

* Practical kitchen ideas. P. L. H. Heine.—p. 46.
* How to use films for employee training. D. E. Lundberg.—p. 64.

Kitchen Planning. If a kitchen installation is to be planned properly, certain procedures should be followed. These include obtaining expert advice from qualified kitchen engineers and considering certain fundamental standards, such as ease of supervision and control, and good working conditions. Suggestions for setting up the various sections of an institutional kitchen are included.

Employee Training. The use of films in employee training is considered. The technique for presenting the films is outlined. A list of training films is given also.

JOURNAL OF HOME ECONOMICS

Vol. 42, May, 1950

* A study of children's eating habits. M. Potgieter and V. Everitt.—p. 363.

Children's Eating Habits. A one-week survey of 385 children's normal eating habits was taken in five elementary schools in Willimantic, Connecticut, in grades four through eight. The diets were rated according to the Basic Seven. The relation between the adequacy of the diets and the physical, scholastic, and emotional well-being of the children, as determined from the school records, was noted. The survey showed the need for stressing the importance of fruits, vegetables, and whole-grain cereal products in the diet. The majority of the children were shown to be eating poor diets. The study served as an excellent teaching tool.

PRACTICAL HOME ECONOMICS

Vol. 28, May, 1950

* TV and the home economist. H. Kirtland.—p. 223.
* School feeding and safety first. E. S. Ferguson.—p. 241.

Television and the Home Economist. Opportunities for appearing on television programs are increasing as far as the home economist is concerned. Because it is a fairly new field and techniques are still being perfected, it is difficult to achieve expert performances. However, suggestions are given for preparation for a television appearance. Not only the program is considered, but also such points as make-up, textures of materials, and colors. The opportunities for home economists in television are stressed.

Safety in School Feeding. When a new school lunch program was started recently in an elementary school in the East, careful instruction in safety practices was given to the employees. The most common causes of accidents were reviewed. These causes are discussed.

QUICK FROZEN FOODS

Vol. 12, May, 1950

* New frozen purées from citrus fruits. E. A. Beavens.—p. 60.

New Frozen Purées from Citrus Fruits. Reported here is the processing method developed for preparation of frozen citrus purées. The method of use for the purée is suggested in several recipes for frozen desserts and baked goods.

RESTAURANT MANAGEMENT

Vol. 66, May, 1950

* Selling salads—in season and out. A. Easton.—p. 56.

Selling Salads. Salads are merchandized by menu description or pictures, selective salad trays, counter displays, salad cart, bar, or counter. Place mats which have pictures or stories of the feature salads have special appetite appeal. Suggestions for salads include grapefruit and black olive salad; fresh fruit medley with grapefruit sections, avocado slices, and banana logs with lime cream dressing. French dressing variations are: sieved cranberry sauce; chili sauce and tarragon vinegar; and chopped candied ginger and green pepper.

WHAT'S NEW IN HOME ECONOMICS

Vol. 14, June, 1950

* Facts on fruit forms.—p. 31.

Fruit Forms. This article deals with the different forms in which the various fruits may be obtained. For example, the varieties of apples are listed and the particular fruit is presented as fresh and canned, as applesauce, apple juice, and so on. The same procedure is carried out for other fruits, and the information serves as a background for better and more interesting food selection.

Meat Yield Calculated from Live Weight of Chickens

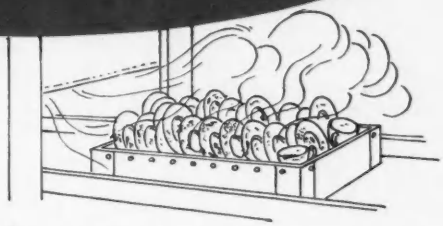
Difficulties are encountered in calculating the dressed weight, eviscerated weight, and weight of edible meat to be expected from live poultry. Calculated percentage yields were found to vary widely from the true amounts. By carefully weighing large numbers of individual live chickens and the dressed and eviscerated carcasses and edible meat obtained from them, the relationships among these weights were demonstrated and mathematical formulas derived which make it possible to calculate accurately the dressed weight, eviscerated weight, and weight of edible meat from the live weight.

This method of calculation has been tested on growing and mature Rhode Island Red chickens, and in comparing yields of New Hampshire and Cornish males and crossbred males obtained from these breeds. The Cornish gave a larger eviscerated carcass and more edible meat for each pound of live weight than the New Hampshire, Rhode Island Red, or the crossbred.

This study was conducted with the aid of funds provided by the Research and Marketing Act of 1946.—*From Report of the Chief of the Bureau of Animal Industry, Agricultural Research Administration, U. S. Department of Agriculture, in 1949.*

HOW "CLEAN" GARBAGE AND DIRTY DISHES GO HAND IN HAND...

Sca-r-o-o-s-h! The dishwasher gets another load of garbage. What a soil load! No dishwashing machine on earth can handle it.



Grease and leftovers still on the dishes. Odors and bacteria thrive. The best ware looks work-stained and weary in practically no time.

One-time patrons nibble and say "never again." Another big load of garbage for the dishwasher. This circle is really vicious.

Pre-Rinse and Calgonite change it all!

1. Pre-rinse!

The first step in proper mechanical dishwashing is *pre-rinsing*. Pre-rinsing prevents accumulation of excessive soil load in the dishwashing machine. Pre-rinsing keeps insoluble material from plugging the washer arms of the machine and reducing pump efficiency. Note—a line drawing of *Pre-Rinse sink* is available upon request.

2. Calgonite!

The second step in proper mechanical dishwashing is Calgonite. Calgonite is the best dishwashing compound. Calgonite removes and prevents washing film . . . softens water . . . stimulates powerful alkaline cleansing in soft or hard water . . . prevents scum and scale on your dishes, in your dishwasher . . . lets you wash dishes and glasses clean *together*. Test Calgonite in your dishwasher. Compare Calgonite with *any* other compound on cost-per-*clean*-dish.

For free dishwashing booklet—"Better ways to cleaner wares," write Calgon, Inc., Hagan Building, Pittsburgh 30, Pennsylvania.

Calgonite®

News Notes

Dr. Ohlson Receives Borden Award. July 13, at the convention of the American Home Economics Association in Boston, Dr. Margaret A. Ohlson, Head, Foods and Nutrition Department, Michigan State College, East Lansing, and Secretary of A.D.A., was named as recipient of the 1950 Borden Award for distinguished work in nutrition. She received this honor for her work on the nutritional status of women, energy metabolism, and metabolism of nitrogen and certain minerals and vitamins.

Red Cross Nutrition Service. The name of the Nutrition Service of the American Red Cross has been changed to Food and Nutrition Service. Pauline Murrah, Red Cross Representative and National Director of the Service, says that the change reflects a new emphasis on activities.

Dietetic Interns Graduate. Twenty-one dietetic interns received certificates from *Saint Marys Hospital*, Rochester, Minnesota, on June 9. A check to cover expenses for a trip to the national A.D.A. convention was presented to Sister Mary Lambert, Millvale, Pennsylvania, who was selected as outstanding in achievement, personality, aptitude for dietetics, scholarship, and leadership. Alice Biester, Professor of Nutrition, University of Minnesota, and President of the Minnesota Dietetic Association, spoke on "The Dietitian and Her Profession." Graduating interns were: Dorothy Alice Behnisch, College of St. Teresa; Sister Bernard, Fontbonne College; Nan Bernstein, Iowa State College; Elia Josefa Camorlinga, Marywood College; Barbara Lee Clark, Ohio State University; Theresa Depippo, Simmons College; Evelyn Mikiko Dotemoto, University of California; Mary Lou Johnson, College of St. Teresa; Sister Mary Lambert, Mount Mercy College; Catherine Mary Liebmann, St. Marys College; Sister Marianna, Fontbonne College; Sister Jean Marie, Fontbonne College; Helen Rita Nugent, Ursuline College; Merlene Paxton, Utah State Agricultural College; Roberta Jeanne Powelka, College of St. Teresa; Sister Julia Raymond, Nazareth College; Sister M. Rita, Mount Mercy College; Mary Patricia Rock, College of St. Teresa; Margaret Mary van Haaren, Siena Heights College; Sue Alyce Williamson, University of Oklahoma; and Sister Francis Solano, Santa Barbara College.

The following interns at *VA Center, Los Angeles*, received certificates at a graduation program in July: Marianne Anderson, Clarke College; Alyne Brice, University of Texas; Patricia Campbell, Mount St. Mary's College; Margaret Daws, University of North Dakota; Phyllis DiPilla, Immaculate Heart College; Sonja Gambera, University of California, Los Angeles; Beverly Grow, University of Utah; Frances Lilly, University of California; Frances McRae, University of Arizona; Patricia Reisner, Mount St. Mary's College; Florence Smith, Mundelein College; and Glenette Zook, University of North Dakota.

Six dietetic interns graduated from the *Milwaukee County Institutions* on August 4 at a tea and reunion held at Milwaukee County Hospital. W. L. Coffey, Director of Milwaukee County Institutions, told "The Story of the Institutions," and Lois Egan, an alumna of the course, spoke on "Dietetics, Its Possibilities and Challenges." The graduates were: Gertrude Schroeder, Michigan State College; Joan Sundeen, St. Olaf's College, Iris Thoele, College of St. Scholastica; Jane Tracy, Fontbonne College; and Mary Williams, Clarke College.

Six graduate students at *Mills College*, Oakland, California, completed a ten-month administrative internship in June. The new dietitians are: Leean Covlin Martin, Oakland; Jacquelin Bergold, Cincinnati; Arlene Dance, Blackfoot, Idaho; Bervian Hansen, Greenwich, Connecticut; Helen Roesler, Claflin, Kansas; and Yvonne Smith, Duluth.

Institute on Food Service. An Institute on Food Service was held by Michigan State College in cooperation with Michigan Hospital Association May 24 to 26 to teach food service personnel to operate efficiently and to prepare nutrious food economically. Talks included:

"Feeding the Hospital Patient" by Marie Pattani, Dietitian, Harper Hospital, Detroit

"Work Simplification" by Jean Hughes Voorhies, Instructor in Institution Management, Wayne University, Detroit

"Why Do It the Hard Way?" by Margaret Childs, Michigan State College

"Food Purchasing" by Katherine Seelye Claus, Dietitian, Community Hospital, Coldwater, Michigan

"Food Preparation" by Jean Stewart, Chief Dietitian, Edward W. Sparrow Hospital, Lansing; Miss Stewart also spoke on "Food Cost Control."

"Menu Planning" by Olive Henderson, Dietitian, Ingham County Tuberculosis Sanitorium, Lansing

At a session on "Kitchen Sanitation" Dave Koehler of the Sanitary Engineering Staff of Michigan State College, discussed dishwashing machines. At the final luncheon, Mary I. Barber, former Director of Home Economics, Kellogg Company, spoke on "Good Food Is Fun."

Institute in Cleveland. An Institute for Therapeutic and Teaching Dietitians was held June 8 and 9 at Western Reserve University, Cleveland. Dr. Max Miller spoke on current concepts in treating diabetes, and Dr. Samuel Spector discussed "Diabetes in Children"; Dr. Arnold Lazarow spoke on "Research in Diabetes." Mary Madsen discussed the "Patient from the Standpoint of the Medical Social Worker" and conducted a panel discussion on the subject together with Ruth Laidig. Marjorie Esson talked on planning diets for patients with diabetes and patient instruction. Frances Fisher, Margene Faddis, and Margaret Simpson spoke of "A New Approach to the Teaching of Nutrition and Diet Therapy to the Student Nurse." The following group discussions were held: "Re-evaluation of the Soft Diet"; "Techniques to Improve the Palatability of the Restricted Salt Diet," and "Nutrition Education in Pregnancy and Lactation."

Food Service Workshop. June 12 through 14 were the dates for a Food Service Workshop in Columbus, Ohio, jointly sponsored by the School of Home Economics, Ohio State University, the Division of School Lunch of the State Department of Education, and the Ohio Dietetic Association.

Total attendance was 266, the majority from school lunch group. Preregistration indicated that about half of those who would attend were cooks and cook-managers, and provision was made for their interests in planning the program. Demonstrations were held to show proper mixing methods, especially when dried milk and dried eggs were used. Donated creamed turkey on corn bread made with dried eggs and milk was the main dish of the demonstration dinner (Type A menu supplemented with fruits and vegetables in excess of the requirement). A second demonstration showed simple preparation procedures illustrating the principles of work simplification, including peeling hard-cooked eggs and dicing potatoes.

The program included several talks on the development of the school lunch program, as well as the following talks on food administration topics:

"Kitchen Planning and Equipment" by W. H. Frick, Kitchen Engineer of Cleveland.

"Food Service Sanitation" by O. C. Carter, Assistant Chief Sanitary Engineer, Ohio State Department of Health.

"Food Cost Control Methods" by C. F. Miller, Assistant Comptroller, Ohio State University, and Eleanor Peterson, Chief Dietitian, Riverside Hospital, Toledo.

"Labor Regulations" by Harry C. Eader, Executive Secretary, Ohio Hospital Association, Columbus.

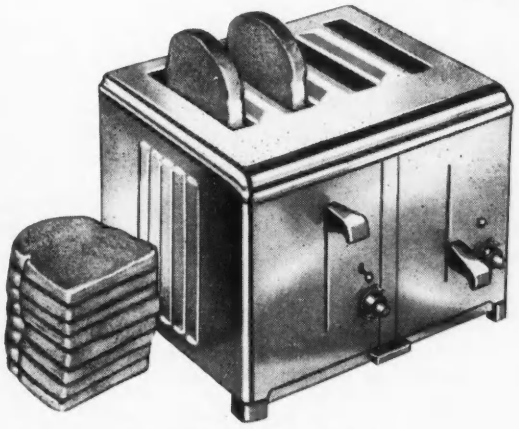
Meeting of Institute of the Friends of the Land. The ninth annual Institute of the Friends of the Land, an organization for conservation, nutrition, and health, was held at the Stevens Hotel in Chicago, July 6 and 7. Speakers and their subjects included:

All toast served to patients (with the exception of that used with creamed foods) is prepared with "Toastmaster" Toasters in diet kitchens such as this on the fourth floor of Illinois Masonic Hospital. Thus, toast is always served hot, fresh, and delicious.

In the hospital cafeteria, 600 meals per day are served to employees, doctors, and visitors. This 8-slice "Toastmaster" Toaster meets all the toast requirements—and particularly the breakfast rush—with ease.

Hospital toast can be served hot, fresh, and delicious . . .

here's how Illinois Masonic does it!



4-SLICE MODEL • $99.50

(Fed. Excise Tax incl.)

Two, four, eight, and sixteen-slice models range in price from $52.00 to $410.00. (Fed. Excise Tax incl.)

TOAST THAT IS ALWAYS hot and fresh means a lot to patients, especially since toast is served so frequently in many diets. Yet usually toast cools, grows soggy between the time that it's made and finally served.

NOT SO AT THE Illinois Masonic Hospital. This 225-bed, six-story Chicago institution has a "Toastmaster" Toaster at work on every floor. Toast for each floor is made in the diet kitchen—*on that floor.* So toast always reaches patients hot, fresh, and delicious. The "Toastmaster" Toaster in the main kitchen is used exclusively for toast served under creamed foods.

TRY PUTTING A "Toastmaster"* Toaster on diet-kitchen duty. You'll be happy with its completely automatic operation, the time and steps it saves in snack-making, the sturdiness of its construction, the ease with which it can be kept clean. And how your patients will appreciate the perfect toast—the hot, fresh, delicious toast you serve. Call your food-service equipment dealer, today.

TOASTMASTER

AUTOMATIC POP-UP TOASTERS

*"Toastmaster" is a registered trademark of McGraw Electric Company, makers of "Toastmaster" Toasters, "Toastmaster" Waffle Bakers, "Toastmaster" Roll and Food Warmers, and other "Toastmaster" Products. Copr. 1950, Toastmaster Products Division, McGraw Electric Company, Elgin, Ill.

"Soil Genesis and Cartography" by Dr. Guy D. Smith, Division of Plant Industry, U.S.D.A.
"Soil Physics" by Dr. Helmut Kohnke, Department of Agronomy, Purdue University
"Economics of Land Utilization" by Dr. John Timmons, Iowa State College
"The Chemistry of Soils" by Dr. Emil Truog, University of Wisconsin
"Soil Nutrients and Soil Fertility" by Dr. K. Starr Chester, Supervisor, Agricultural Division, Battelle Memorial Institute, Columbus, Ohio
"Soil Microbiology" by Dr. Oscar Nelson Allen, University of Wisconsin
"Adjusting Soil Nutrients to Meet the Specific Needs of Crops" by Dr. Roger Bray, University of Illinois
"Let the Plants Make the Diagnosis of 'Hidden Hunger' for Us" by Dr. George D. Scarseth
"A Symposium on Soil-Health Relationships" by Dr. Grant H. Lainz, Department of Medicine, Northwestern University
"Soil Nutrients and the Health of the Plant" by Dr. R. V. Allison, University of Florida
"Soil Nutrients and the Health of Domestic Wild Animals" by Dr. George K. Davis, University of Florida
"Soil Nutrients and the Health of Man" by Dr. Henry Trautman, Madison, Wisconsin.

U.S. Air Force. On June 13, a release from the Office of the Surgeon General, U.S. Air Force named officers nominated for regular commissions in the Air Force Medical Service. Included was the name of 1st Lt. Barbara L. Northrup of Corte Madera, California, as a new appointment to the Dietetic Section of the Air Force WMSC.

Mrs. Griem Receives Award. Breta Luther Griem, Manager, Milwaukee County School Lunch Program, received one of two Wisconsin Restaurant Association Awards of Merit for 1949 for contributing "most to the food service industry in Wisconsin in 1949." A gold award was presented to her at the 17th annual convention of the Wisconsin Restaurant Association.

Dallis Nadine Worthy. Word has reached the Association office of the death on May 1 of Dallis Nadine Worthy of LaGrange, Georgia. She had been a member of the Association since 1945, and has been employed at both the Oschner Clinic and Foundation Hospital in New Orleans.

Lane Bryant Annual Award. An annual award of $1000 for volunteer service to the community is given by Lane Bryant, Inc., 465 Fifth Avenue, New York 17. Nominations for the year 1950 will be received up to March 1, 1951. To publicize the award, a booklet, as well as nomination forms are available on request to the Award Committee at the above address. Either an individual or a group is eligible, provided that volunteer, non-remunerative efforts of the nominee have improved community living, i.e., in social welfare, housing, education, health or special investigations which have resulted in changes that benefit the family life of the community, city, state, or nation.

New Agriculture Handbook. *Composition of Foods, Raw, Processed, Prepared,* Agriculture Handbook No. 8, has been published by the U.S.D.A. Bureau of Human Nutrition and Home Economics. The new 147-page handbook, written by Bernice K. Watt and Annabel L. Merrill, assisted by Martha Louise Orr, Woot-Tsuen Wu, and Rebecca Koonce Pecot, replaces Miscellaneous Publication No. 572, *Tables of Food Composition in Terms of Eleven Nutrients,* published in 1945 in cooperation with the National Research Council. Data on the proximate composition and mineral and vitamin content of foods are presented in three tables, labeled: "Composition of foods, 100 grams, edible portion," "Composition of foods, 1 pound, as purchased," and "Composition of foods, common household units." The foods have been arranged alphabetically with cross references and have been numbered uniformly in all tables to aid the user in finding the items listed. Cooked foods, a few prepared dishes, and frozen foods have been included for the first time. In Table 1 is provided information required when the percentage composition of the edible portion of foods is needed. It contains information in the form wanted to calculate nutrients in studies in which food

Ease of operation, versatility and accuracy of control are features of this Blodgett No. 931 Gas-Fired Bake Oven.

Baked foods are of many types. Each must be tasty, healthful and easily digested, while retaining full food value and eye-appeal, according to Miss Eileen Pangburn, student teacher at this noted Los Angeles hospital.

Adds Miss Pangburn: "The versatility, ease and speed of changing from one desired temperature to another, and the accuracy and dependability of control are characteristics required in our operation—and obtainable in our Blodgett Oven."

Write today for literature.

ONE HUNDRED YEARS OF
THE G. S. BLODGETT CO., INC.
OVENS
50 LAKESIDE AVE., BURLINGTON, VERMONT

COOL MELON SALAD

Melon balls in tangy Lime Jell-O make this refreshing midsummer treat. (Takes 2 quarts melon, slightly salted, to 3 quarts Jell-O.) Sure to appeal as salad or dessert. It costs approximately . . .

3¢ A SERVING!

PEACH-ALMOND PUDDING

Special for the peach season: Drained sweetened sliced peaches between 2 layers of delicate Jell-O Vanilla Pudding, flavored with almond extract. On top, a meringue, sprinkled with cake crumbs or chopped toasted almonds, and browned in a hot oven. A luxury dessert that costs about . . .

4¢ A SERVING!

BOSTON LEMON CREAM PIE

Use flavor-fresh Jell-O Lemon Pie Filling between the cake layers for a delicious variation of the ever-popular Boston Cream Pie. Easy to make at a cost of about . . .

4¢ A SERVING!

Put genuine

JELL-O DESSERTS

on your menu and

cut your food costs!

Nothing less than genuine Jell-O desserts will do for the restaurant manager who wants to build up volume and cut food costs down.

For as little as 1½¢ to 4¢ a serving, you can offer a colorful variety of finest quality desserts with Jell-O and Jell-O Puddings and Pie Filling.

Keep in mind that many desserts cost 2 or 3 times as much and that desserts alone account for up to 20% of total food costs, and you'll see what a real *saving* Jell-O desserts can mean.

Be sure to serve genuine Jell-O flavored gelatin . . . Jell-O Puddings . . . Jell-O Lemon Pie Filling.

Tops in quality for more than 50 years, Jell-O is the brand your customers know best and prefer. Any slight difference in initial cost is outweighed by your gain in customer acceptance . . . quality . . . and volume!

FREE RECIPE SERVICE:

Ask your General Foods representative about these and many other Dessert and Salad recipes, or write General Foods, Institution Department, 250 Park Avenue, New York 17, New York.

Products of General Foods

JELL-O, JELL-O PUDDINGS
JELL-O LEMON PIE FILLING

Jell-O is a registered trade-mark of General Foods Corporation

intake is weighed. Water, ash, and fiber have been included in this table, but not in the others. In Table 2, figures on refuse ordinarily found in foods on the retail market are shown. The data in Table 3 will be helpful in estimating nutrient values of unweighed portions of foods as served and in rating individual diets in certain types of dietary surveys.

Plentiful Foods. The following foods are expected to be plentiful in August:

Fresh fruit and produce

Cabbage
Carrots
Potatoes, Irish
Vegetables, locally grown
Watermelons

Miscellaneous foods

Chickens—broilers, fryers, and hens
Eggs
Fish—frozen and fresh
Honey
Milk and manufactured dairy products

Canadian Nutrition Standards. The March, 1950 issue of the *Bulletin of the Canadian Council on Nutrition* (Vol. 2, No. 1) is devoted to a presentation of "A Dietary Standard for Canada Approved by the Canadian Council on Nutrition, Ottawa, December 7, 1948." Copies may be obtained for $1.00 from Department of Public Printing and Stationery, Ottawa.

British Dietetic Association. The British Dietetic Association has been using much of the A.D.A. literature as source material, and letters to the A.D.A. staff have indicated that this material has been most stimulating and helpful. The B.D.A. has announced the formation of two local branches—one in the Midlands and one in the North of England. These are in addition to the flourishing Scotish Branch which has been active for many years.

Revised Booklet on Planning Diabetic Diets. The changes in the booklet on meal planning for the patient with diabetes are based on the recent recommendations of the joint committees appearing in the article which begins on page 575 of this issue. The booklet, titled "Meal Planning with Exchange Lists," includes in tabulated form the various exchange lists. Line drawings illustrate the various classes of foods included in each. A number of recipes showing how foods may be combined are also included. In addition, a set of seven cards, including a "Diabetic Diet Card for Physicians," and one card each for the six meal plans mentioned in the article have also been prepared. This material is available from Health Publications Institute, Inc., 216 North Dawson Street, Raleigh, North Carolina. Prices are as follows: meal planning booklets, 10 cents each, $4 per 100, and $35 per 1000. The diet card and meal plans are 5 cents each, 75 cents per 100, and $5 per 1000. Quantity orders for less than 100 copies are sold on a pro rata basis.

serve finer foods...
FASTER
with
MARKET FORGE
STEAM COOKERS
You can serve hot, fresh, appetizing meals in less time and with less work when you cook with Market Forge Steam Cookers. Food is tastier. Cooking is faster. Waste and shrinkage is cut. Steam cooking saves you time and labor because it eliminates washing heavy pots and pans. There is never any burned food.
Cook with Market Forge Steam Cookers. Get these major advantages originated by one of the oldest and largest companies manufacturing steam cookers today — Market Forge.
• One-piece sanitary shelves.
• Removable inner door.
• Complete stainless steel interior including the door.
• Seamless round-cornered baskets.
• Insulated door front.
Send for big Free Manual on Steam Cooking Today. Write Dept. K
Market Forge Company
EVERETT 49, MASSACHUSETTS

News of State Associations

Arkansas Dietetic Association. The following officers were elected by the Arkansas Dietetic Association for 1950–51: President-Elect: Christina Doyle Spear; Secretary, Margaret Leahy; and Treasurer, Olive Bost.

California Dietetic Association. The *Bay Section* again this year has contributed money to pay for the full salary of a dietitian at the summer camp for diabetic children. Although the money comes from the Bay Section funds, it is offered as a gift from the California Dietetic Association as a whole.

Officers of the Bay Section elected for 1950–51 are: Chairman, Frances Dahl; Vice-Chairman, Virginia McMasters; Secretary-Treasurer, Clara Beth Young; and Director, Helen Walsh.

Colorado Dietetic Association. The annual spring meeting of the Colorado Dietetic Association was held May 20 at Denver General Hospital. Following the business meeting, a luncheon featuring Chinese decorations and Chinese food was enjoyed. Dr. Bernard T. Daniels of Denver talked on "The Medical Aspects of Free Enterprise." Following him, M. Walter Pesman presented a speech on the possibilities of food production and distribution throughout the world. Mr. Pesman stressed the importance of "one world" in fair distribution of food. A tea was given in honor of the dietetic interns and home economics students from local colleges and high schools.

Mabelle V. Williams, President of the Colorado Dietetic Association, assisted by Bernadette Costello, Public Relations Chairman, entertained with a series of "President's Teas" in February of this year at her home. The invitation list was limited to Denver members of the Association, because of rather wide scattering over the state of the others. More than half of the members attended the three teas.

Illinois Dietetic Association. The winner of the Illinois Dietetic Association's first writing contest for dietetic interns was Teresa Van Hulla, of Hines VA Hospital. Her paper, which was published in the summer issue of the *Bulletin of the Illinois Dietetic Association* was titled "How You Can Achieve Quality Food Production Today." Miss Van Hulla won a prize of $25 in cash.

Hawaii Dietetic Association. On June 15, the Hawaii Dietetic Association met at Tripler General Hospital for installation of new officers, who are: President, Mary Lum; President-Elect, Elsie Boatman; Secretary, Ruth Toresen; and Treasurer, Virginia Cooksey.

Projects of the year were summarized at this meeting. The revision of a low-salt diet was completed and ready for publication. This diet utilizes the local products and can be adjusted to conform to various food habits.

The Association has been active in public relations this year. In the spring,

LARD...

More Than a Superior Cooking Fat

As a cooking fat for sautéing, shortening and deep frying, lard has long enjoyed a favored position with cooks and housewives. It is economical, tasty and easy to use, and produces foods of outstanding flavor and eye appeal.

But lard is more than a mere shortening agent. It is an excellent source of the unsaturated fatty acids, linoleic, linolenic and arachidonic acids. These important nutrients must be supplied by the foods eaten; the ability of the human organism to synthesize them is limited. An inadequate intake of the unsaturated fatty acids can lead to certain skin diseases in both children and adults. As a source of the unsaturated fatty acids lard is superior to many other cooking fats in which the fatty acid content is destroyed or modified during processing.

Lard is one of the most digestible of all edible fats. Hence it yields its caloric food energy readily and offers no difficulty when the digestive processes are normal.

The Seal of Acceptance denotes that the nutritional statements made in this advertisement are acceptable to the Council on Foods and Nutrition of the American Medical Association.

American Meat Institute
Main Office, Chicago...Members Throughout the United States

it participated in the home economics convention at the University of Hawaii. Vocational guidance pamphlets about dietitians were distributed. A series of articles featuring dietitians in the various fields of work in Hawaii have also been published in the Honolulu *Star-Bulletin*.

Kansas Dietetic Association. Dr. Abby Marlatt, Kansas State College, is the new President-Elect of the Kansas Dietetic Association. Other new officers are: Vice-President, Ina Belle Zimmerman; Secretary, Ellen Hanke; and Treasurer, Patricia O'Loughlin.

On March 18 in Topeka, the Kansas Home Economics and Dietetic Associations held a school lunch symposium. Dr. Marie Zepplin, University of Kansas, was the principle speaker and took as her topic the subject of dental caries and diet.

Berdena Rosenow, University of Kansas Medical Center, spoke on April 23 before a Camp Institute sponsored by the Missouri Valley Section of the American Camping Association. The institute was held at the State Park in Knobnoster. Miss Rosenow's subject was child feeding as it related to camp life. She stressed the need for an adequate diet and proper food handling and dishwashing procedures.

Maine Dietetic Association. The spring meeting of the Maine Dietetic Association was held at the VA Hospital at Togus on May 10. Visits were made through the General Medical Service and Neuropsychiatric Hospital. Among the speakers were the Chief of Medicine, the Manager of the hospital, and the Chief Medical Officer.

Minnesota Dietetic Association. The Minnesota Dietetic Association held its spring meeting May 18–19 in Minneapolis Auditorium. Speakers and their subjects were:

"The Practical Application of Art in the Institution Dining Room" by Gertrude Esteros, Assistant Professor of Home Economics, University of Minnesota

"Sharpening Our Communication Skills" by Dr. James I. Brown, Associate Professor of Rhetoric, College of Agriculture, Forestry, and Home Economics, University of Minnesota

"The Trend of Diabetic Diets" by Joyce Lettner, Ancker Hospital, St. Paul

"The Cost and Nutritive Value of Some Supplementary Protein Foods" by Mary Des Lauriers and Lois Ragen, University of Minnesota Hospitals

"As the Wheel Spins" by Sister Julia Raymond, St. Marys Hospital, Rochester

"Recent Developments in Food Research," by Belle Lowe, Professor of Foods and Nutrition, Iowa State College, Ames

"Practicing Medicine Behind the Iron Curtain" by Dr. Mitrofan Smorszczok, St. Marys Hospital, Rochester

"Community Nutrition Facilities in the State of Minnesota"—a panel discussion

"Public Health Aspects of Brucellosis" by Dr. Wendell H. Hall, University of Minnesota and VA Hospital, Minneapolis

The program also included workshops having the following titles: "Trends in Teaching Foods, Nutrition, and Diet Therapy in Accredited Schools of Nursing in Minnesota"; "Group Feeding of Children in Institutions"; "Administrative Problems"; "Personnel Training"; "Do Your Dollars 'Do You or Do for You'?"; and "The Dietitian in Labor Relations, Departmental Relations, and Public Relations."

The *Rochester Dietetic Association* reports that one of its meetings this year was devoted to community nutrition, and that local public health nurses, physicians, social service workers, newspaper reporters, grocers, and restaurant owners joined the dietitians on the panel. Other meetings of the year have included an illustrated lecture on "Art in Everyday Life," and lectures on "Compound E" and "Child Nutrition and Health."

New Jersey Dietetic Association. A committee of the New Jersey group is preparing a narrative handbook on "Cafeteria Equipment—Its Selection and Placement." Lendahl Kotschevar, equipment and nutrition research technologist at the U. S. Naval Supply Depot, Bayonne, heads the committee.

Members of the New Jersey Association have been active in vocational guidance work this year. Irma Donnelly has spoken at "Career Day" to students at Flemington High School, and Ruth Raymond talked to eighth graders and junior and senior high school students at Dover High School, on "Careers in Dietetics." The film, "The College of Home Economics," was shown. It is reported that one of the senior students, already enrolled to enter New Jersey College for Women, has decided to change her major field to dietetics, as a result of Mrs. Raymond's presentation.

New York Dietetic Association. The final meeting of the *Greater New York Dietetic Association* was a dinner meeting held at Horace Mann Cafeteria at Teachers College. Patricia Neighbors of the Powers School, Inc., spoke on "Your Personality." Alta Atkinson, Teachers College, was elected President.

The April 3 meeting of the *Hudson Valley Dietetic Association*, held in Albany, was devoted to vocational guidance and a discussion of "Job Opportunities for Food and Nutrition Specialists." Students from Skidmore College, dietetic interns from Albany Hospital, and apprentice nutritionists of the N. Y. State Department of Health presented a skit on the work of the hospital dietitian and the public health nutritionist. Guests for the evening were vocational guidance leaders from high schools in the area. The skit was repeated a week later at Skidmore College for the freshman students.

The Rochester Dietetic Association held election of officers June 6 at Strong

FOR THE DIABETIC~

A SALAD DRESSING OF KNOWN FOOD VALUE

Add zest and flavor to green salads, gelatin desserts, and hot vegetables with delicious SOYAMAISE. Made of soy bean oil, SOYAMAISE adds fat but is relatively low in carbohydrate. SEND FOR GENEROUS FREE SAMPLE.

Also Made Without Salt

Analysis	
Fat	85.07%
Protein	1.63%
Carbohydrate	0.79%
Ash Mineral	0.18%

FREE CATALOG

Send for new catalog of Cellu Dietary Foods, including tasty recipes, tables of food values, vitamin charts, etc.

LOW CARBOHYDRATE

CELLU *Dietary Foods*

CHICAGO DIETETIC SUPPLY HOUSE *Inc.*

1750 West Van Buren Street Chicago 12, Illinois

"Open Sesame!"
FOR QUALIFIED
DIETITIANS
PHYSICAL THERAPISTS
OCCUPATIONAL THERAPISTS
That's what the new Women's Medical Specialist Corps can mean to you—a modern magical key to a satisfying and rewarding career in the U. S. Army or the U. S. Air Force.
Recently organized, the WMSC offers you young professional women—holders of a baccalaureate degree and a certificate in the specialty—original commissions as Second Lieutenants and an opportunity for a wide clinical practice rarely found in civilian pursuits.
And a happy personal life in the WMSC is assured by the many unique benefits you receive—officer's status, pay and allowances; travel; free medical and dental care; social life and recreational facilities; post-graduate study; retirement pay.
Try this modern magic key!
Write to Surgeon General, U. S. Army
or Surgeon General, U. S. Air Force
Washington 25, D. C.
for full information
Women's
Medical
Specialist
Corps

Memorial Hospital. Officers for the coming year are: President, Helen Griffith Ingerson, Chief Dietitian, Rochester General Hospital; President-Elect, Wintress D. Murray, Nutrition Adviser, Eastman Kodak Company; Vice-President, Elizabeth Walker, Research Dietitian, Strong Memorial Hospital; Secretary, Irene Anderson, Dietitian, Rochester Products; and Treasurer, Ferne King, Instructor, Rochester Institute of Technology.

Nebraska Dietetic Association. The *Omaha Dietetic Association* has had a number of interesting programs this year. At one, Dr. E. M. Limbert, Council Bluffs, Iowa, spoke on "False Ideas of Medicine." At another meeting, a symposium on "Teaching the Student Nurse" was held. At this meeting, nurses were entertained as guests. Another program consisted of a panel discussion on "Low-Cost Menus and Buying Procedures," while the last meeting of the year was devoted to "New Ideas in Special Diets."

The *Lincoln Dietetic Association* recently held a discussion and demonstration on frozen foods. At other meetings during the year a representative of the State Board of Control spoke to the group about state institutions, and the Executive Secretary of the Nebraska Medical Association talked on socialized medicine. Another program featured a panel discussion of food budgets by a homemaker, a public health nurse, a social case worker, a nutritionist, and a teacher. This year the Association also entertained the seniors majoring in dietetics and institutional administration at the University of Nebraska.

Ohio Dietetic Association. The *Cincinnati Dietetic Association* held its final meeting at the Kenwood Country Club where guests participated in golf, swimming, and a buffet supper. New officers for the coming year are: President, Helen Volk, Cincinnati General Hospital; President-Elect, Dorotha Simons, Christ Hospital; Vice-President, Marjorie White, Children's Hospital; Recording Secretary, Thelma Ratcliff, Christ Hospital; Corresponding Secretary, Margaret Dressler, Christ Hospital; and Treasurer, Marian Mock, Good Samaritan Hospital.

Association Activities

A.D.A. Represented. Dr. Margaret A. Ohlson attended the meeting of the Louisiana Dietetic Association in Shreveport, June 30–July 1, as our official representative.

Early in June, Helen E. Walsh represented the Association at the Tenth Biennial Convention of the National Federation of Business and Professional Women's Clubs, Inc., in San Francisco.

New Representative on Commission. The American Hospital Association has asked A.D.A. to appoint a representtivea to the Joint Commission for the Improvement of the Care of the Patient. This commission consists of members of the National League of Nursing Education, the American Nurses' Association, the American Medical Association, and the American Hospital Association. Lucille M. Refshauge, Director of Dietetics, Hartford Hospital, Hartford, Connecticut, has been appointed as our representative. A meeting of the group is scheduled for September 8 and 9 at the Hotel Statler in New York City.

Economic Status of Dietitians. The bulletin, *Survey of the Economic Status of Dietitians*, prepared by the U. S. Department of Labor, is now off the press. The information presented is the result of the material obtained from the questionnaire sent out by the Bureau of Labor Statistics in 1949 to members of A.D.A. and to others in the dietetic field. The bulletin is available from the A.D.A. office. The price is $1.00 per copy.

A.D.A. Exhibits. The Kodachrome exhibit, "Dietetics—the Career with a Choice," was featured at the A.H.E.A. convention in Boston, July 11 to 14. Members of the Massachusetts Dietetic Association took charge of the booth. Another interesting feature of the convention concerned our profession. The Massachusetts Dietetic Association reserved a room at the Hotel Statler for hospitality purposes. The room was staffed by directors of approved dietetic internships in New England in an effort to acquaint more people with the internships and to answer questions relating to them. This public relations gesture can well be followed at future conventions.

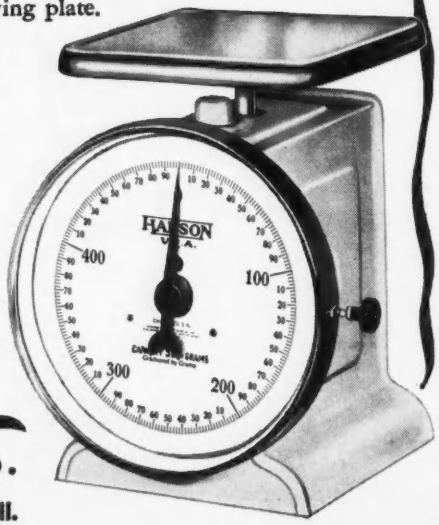
The Kodachrome exhibit will be shown late in August at the Iowa State Fair, and is being sponsored by the Iowa Dietetic Association.

Conference on Guidance and Personnel Services. This conference, an annual affair at the University of Wisconsin was held June 28 to 30 in Madison. For the third year A.D.A. sent vocational literature for distribution. The three-panel vocational guidance exhibit was also on display.

Publicity for the Profession. One of our members, Susan B. Merrow, wrote an excellent article, "Dietetics as a Career," for the June issue (page 22) of *Forecast for Home Economists*. The article is aimed at "Dad," who is interested in his daughter's future. Miss Merrow is Assistant Nutritionist at the Agricultural Experiment Station, University of Vermont and State Agricultural College, Burlington.

"Job Idea: Dietitian" was presented in the July issue of *Glamour Magazine*, page 82. A number of requests for further information on dietetics have been received at the A.D.A. office as a result of this little feature.

Requests for information on dietetics have been pouring in from another source—the July issue of *Women's Day*. A career note appeared on page 4 of this publication and is receiving considerable attention from high school girls.

HANSON
DIETETIC SCALE
The standard diet scale of the medical profession for controlled diets. Rotating dial eliminates computation as each item of food is added on the serving plate.
Capacity 500 grams by grams. Stainless steel platform, white enamel body, easy to keep clean.
Model 1411 (illustrated) has glass protected dial, price $15.00
Model 1440 enamel dial, price $10.00
See your Supply House


HANSON SCALE CO.
Est. 1888
525 North Ada St., Chicago 22, Ill.